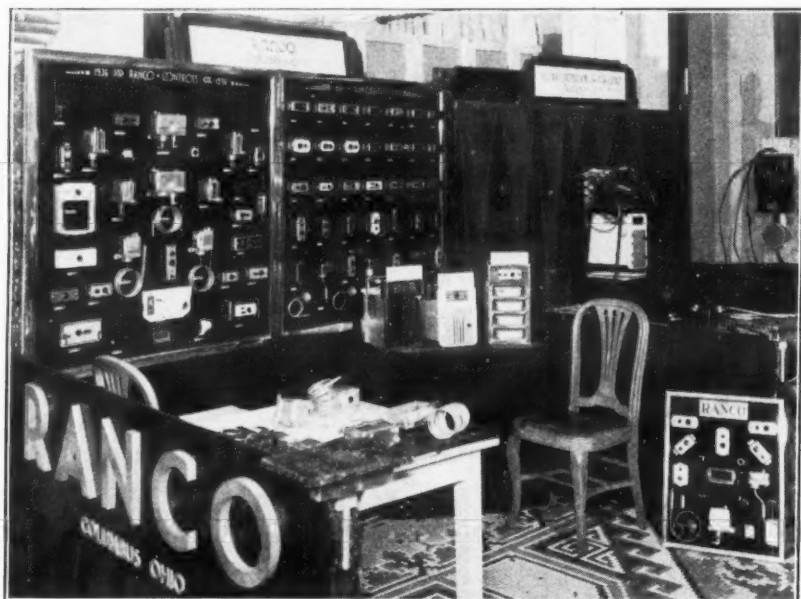


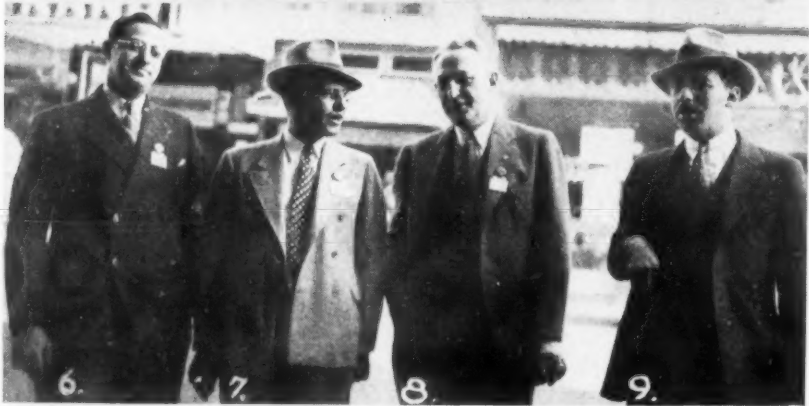
More Pictures from Service Meetings



(1) F. R. Pond, Refrigeration and Industrial Supply Co., Inc., Minneapolis; (2) Joe Oberc, J. M. Oberc, Inc., Detroit; (3) M. W. Applebee, Burstein-Applebee Co., Kansas City; (4) J. D. Colyer, Wolverine Tube Co., Detroit; (5) Arnold Dessau, Melchior, Armstrong, Dessau Co., Inc., New York City; (6) Austin Jones, United Supply Co., Omaha; (7) H. W. Small, Thermal Service, Inc., St. Paul; (8) Mrs. Austin Jones (in last week's issue we had her name incorrectly identified as Austin Jones' sister); (9) C. S. Rugg, Rugg Refrigeration Supply, Lincoln, Neb.; (10) H. W. Dittmeyer, United Wire Supply Corp., Providence, R. I.; (11) M. R. Oberholzer, L. H. Gilmer Co., Philadelphia; (12) L. L. Smith, General Electric Co., Cleveland; (13) A. J. LaGess, Hixson Mfg. Co., Chicago; (14) M. Swam, Zenith Carburetor Co., Detroit; (15) B. J. Zoll, Chicago-Wilcox Mfg. Co., Chicago; (16) Harry Jarow, Jarow Products Corp., Chicago.



This picture, which arrived too late last week, shows the display of equipment made by Ranco, Inc., at the Memphis parley.



(1) Bruce Hale, McGregor's, Inc., Frigidaire distributor, Memphis; (2) M. W. Knight, Peerless Ice Machine Co., Chicago; (3) A. R. Jones, Frigidaire Corp., Dayton; (4) R. N. Merritt, Frigidaire Corp.; (5) George W. Dotson, McGregor's, Inc.; (6) A. G. Weil, Refrigeration Maintenance Corp., Chicago; (7) Here's one we don't know; (8) H. V. Higley, Ansul Chemical Co., Marinette; (9) Dan D. Wile, Detroit Lubricator Co.

Distributors Hear Westinghouse 1937 Plans

(Concluded from Page 1, Column 2)
days. On Friday, department store representatives will move in for a one-day meeting with factory officials. Sessions are being held in the auditorium of the company's new \$700,000 five-story warehousing and office building, completion of which was speeded to have it in readiness for convention meetings, although the building itself will not be dedicated until January.

Details on the 1937 line of household refrigerators will not be released until later this month. Sales and advertising plans, however, will be built around tests on operating cost, operating time, and food compartment temperatures made in 89 actual kitchens throughout the country.

'Hell's Kitchen' Display

With housewives acting as "kitchen hostesses," tests will be conducted—several, in fact, have already been made—and the results will be published in a "family album" from which it is anticipated, dealers and salesmen will glean many valuable sales-clinching arguments.

In addition to the tests in kitchens, made under actual working conditions, dealers will have made available to them a "Hell's Kitchen" showroom display, in which temperatures simulating those in the No. 1 test kitchen, at Para, Brazil, will be possible. A test board on the outside of the "kitchen" will record current consumption and cabinet temperatures, the same as in the regular test kitchens in the homes.

Three series of tests will be run in the home test kitchens—the first in January, the second during the hottest weeks of the summer, and the last in the early fall. Tests will be run over a two-weeks period, and will be divided into several variations. An effort will be made to obtain samples of all types of possible owners—those with large families, those who do a lot of entertaining, and those in both the low and high income brackets. Minute details will be kept on all test kitchens, including money saved by quantity buying. Even the number of times the refrigerator door is opened and closed will be recorded.

Use Government Order in Sales Promotion

Westinghouse intends to make great use next year of its recently won PWA order for 16,697 refrigerators (AIR CONDITIONING AND REFRIGERATION NEWS, Sept. 2 and following). "It's 10-Year Operating Cost that counts" will figure prominently in much of the company's newspaper and magazine advertising, which will be spread over a greater area than ever this year.

As the convention opened Monday morning, distributors and their men were welcomed by Vice President A. E. Allen, who said that while Westinghouse may have been "creeping" along in the refrigeration field during the past, it was definitely ready to "get up and run" now. He told his listeners that the company was "going places in 1937."

1936 Quota Passed

R. C. Cosgrove, manager of household refrigeration sales commended distributors on enabling the company to make a fine showing during 1936. The year's quota for household refrigerators, he said, was reached last Friday. Next year's quota will be increased 30% over that of this year, he added.

Mr. Cosgrove also introduced the 1937 line household units, and outlined features and prices.

After a motion picture explaining the "kitchen testing" plan, P. C. Wilmore gave the distributors the details of "Hell's Kitchen" and other proof materials for showroom use.

"Tickets, Please," another movie, emphasized the value of sound sales training in enabling salesmen to do a better all around job.

Setup for Kitchen Testing

Roger Bolin, the first after-lunch speaker, outlined to distributors the methods and testing materials required for the establishment of a testing kitchen in their own territories, after which Miss Edna I. Sparkman, home service director, urged the men to make more use of "use the user" ideas—simple, homely facts which, she said, stick in the prospect's mind much better than do abstract claims and mechanical details.

J. H. Ashbaugh of Springfield, Mass., manager of refrigeration engineering for the company, next told the story of the mechanical improvements back of the 1937 household line. Other speakers on the afternoon's program were P. Y. Danley, manager of the refrigeration and air-conditioning department, and R. E. Imhoff, sales manager.

Speakers on Tuesday's program in-

cluded, in addition to those already mentioned, Sales Promotion Manager Gil Baird, Paul W. Endress, S. D. Mahan, A. F. Loecher, department store manager; V. E. "Sam" Vining, M. W. Martin, and E. G. Brinsley and G. T. Dunklin of C. I. T. Corp.

Wednesday's program, devoted to ranges, all-electric kitchens, and water heaters, will include as speakers Reese Mills, manager of range sales; I. W. Clark, manager of electric kitchen sales; and W. J. Russell, D. L. Hadley, J. D. Kelly, J. R. Clemens, F. B. Hout, D. S. Stopple, C. G. Hillier, and Miss Pearl Gray.

Commercial refrigeration will occupy the center of attention on Thursday. Speakers include T. J. Newcomb, J. B. Baughman, B. C. Davison, J. P. Clarkin, George Park, L. K. Baxter, and voluntary talks by distributors on "How We Merchandise It."

Neumuller Is Elected International Head Of Electric Leagues

CLEVELAND — Ralph Neumuller, executive vice president of the Electrical Association of New York, was elected president of the International Association of Electric Leagues, at the close of the organization's first annual meeting held here recently.

Re-elected to office were A. A. Gray, treasurer, and O. C. Small, secretary. G. R. Conover, managing director of the Philadelphia Electrical Association, was named vice president. New members of the board of governors, in addition to the organization's officers, are: J. E. North, C. H. Christine, S. S. Vineberg, G. W. Austin, and G. W. Weston.

Leading promotion activities of the electrical industry were discussed at the conference's two full day sessions, attended by executives of 22 electrical leagues.

Spanish Civil War Drops Refrigerator Sales Near Zero

(Concluded from Page 1, Column 3)
tions and 11 household cabinets. We have also sold 4 household cabinets for war purposes, which make a total of 19 units.

We must tell you that the situation as far as the restrictions re imports are concerned is the same as before, and it is not logical to expect better facilities at the present time.

We are quite confident with respect to the future, and are sure that as soon as the war ends the business in refrigerating installations in Spain will once more be prosperous, as you said in your second article respecting Spain.

As far as your articles are concerned we beg to thank you for the good impression you give with respect to your stay with us, you having perfectly understood that Spain is not only typical country but something more. We are sorry for the famous tax of St. Teresa which we must confess we do not know what it can be.

You will easily understand that at the present moment we are quite at a loss to give you our opinion with reference to the models 1937 for which reason we abstain from making any comments on same.

At present there does not exist any competition as the few Spanish manufacturers on account of their little financial resistance have disappeared, and as the foreign competitors are concerned it is not likely there will be shipments of refrigerators for the moment.

Thanking you very much for your kind attention, we beg to remain, dear Sirs,

L. M. RIFA,
Managing Director

The Buyer's Guide

Suppliers Specializing in Service to the Refrigeration and Air Conditioning Industries

REFRIGERATION PARTS and SUPPLIES

SEND FOR OUR BIG BARGAIN CATALOG

Dependable service that enables you to give speedier service—and the lowest prices possible. That's what you secure when you deal with "headquarters" for America's largest line. Write for catalog on your letter-head. Branches: New York—Cleveland—St. Louis

100% WHOLESALE WE PROTECT THE DEALER

The HARRY ALTER CO. 1728 S. Michigan Ave. Chicago, Ill.

A NEW Market

RECONDITIONED

FRIGIDAIRE - KELVINATOR - GENERAL
ELECTRIC - ELECTROLUX - NORGE & others

FOR EXPORT and DOMESTIC USE

A NEW Field

FEDERAL, one of the oldest and largest MFR'S. of REMANUFACTURED refrigerators offers a 100% reconditioned refrigerator rebuilt from top to bottom. That's why they look like NEW and, most important, "WORK LIKE NEW".

Starting at \$30 F.O.B. N.Y.

FEDERAL REFRIGERATOR CORP.
57 EAST 25th ST., NEW YORK CITY
References: Dun & Bradstreet—Nat'l City Bank

UNUSUAL FACTS IN SPORTS



Amateur Trophy Turns Professional

The Stanley Cup, today's coveted possession in professional hockey, was once emblematic of the world's amateur hockey championship. It cost only \$50 and is now over 40 years old. Today it is battered, bent, tarnished and out-of-date.

Your Continued Good Will Is the Trophy We Seek

Borg-Warner's service is friendly, personal—the kind that builds a lasting business relationship. Let us prove that it will pay you to order from Borg-Warner, where stocks are always complete, delivery prompt and prices fair.

REFRIGERATION PARTS & SUPPLIES

Our Catalog Is Yours for the Asking

BORG-WARNER SERVICE PARTS CO.
Division Borg-Warner Corporation
2100 Indiana Avenue Chicago, Illinois

REFRIGERATION NEWS

Established 1926 and Registered U. S. Patent Office as Electric Refrigeration News
Member Audit Bureau of Circulations. Member Associated Business Papers.

VOL. 19, No. 15, SERIAL NO. 403
ISSUED EVERY WEDNESDAY

Entered as second-class
matter Aug. 1, 1927

DETROIT, MICHIGAN, DECEMBER 9, 1936

Copyright, 1936, by
Business News Pub. Co.

THREE DOLLARS PER YEAR
TEN CENTS PER COPY

ASRE Approval Given Codes for Rating, Testing

**H. M. Williams Elected
President of Society for
Coming Year**

NEW YORK CITY—Giving final approval to two codes for rating and testing refrigeration and air-conditioning equipment, listening attentively to a full three-day program of technical papers, and electing officers for the coming year, members of the American Society of Refrigerating Engineers concluded their annual meeting here last Friday at the Hotel Pennsylvania.

Harry M. Williams of the Frigidaire Corp. was elected president of the society for the coming year. Other officers installed were Gardner Poole, Frosted Foods Sales Corp., vice president; George E. Hulise, Safety Car Heating & Lighting Co., New Haven, Conn., treasurer; and the following directors:

L. L. Lewis, vice president and chief engineer, Carrier Corp.; H. D. Edwards, consulting engineer, Union Carbide & Chemicals Corp.; L. A. Phillips, research engineer, Kelvinator Corp.; H. C. Guild, eastern sales manager, Vilter Mfg. Co.; and C. T. Baker, consulting engineer, Atlanta.

Glenn Muffy, consulting engineer of Springfield, Ohio, presented some minor revisions of the codes for final consideration by the members. Only major change was suggested by Walter Fleisher, well-known air-conditioning consultant, who declared that the code for testing air-conditioning equipment, by setting the top evaporator temperature at which cooling equipment could be rated at 40° F., precluded the rating of equipment which used methods in which evaporator temperatures were necessarily higher than 40° F.

Some objection was also made to the code on the ground that it called for tests which were too expensive for many manufacturers to set up and conduct.

With respect to codes, the members heard Chester Lichtenberg of the General Electric Co. call for action by the ASRE on the preparation and adoption of "application" codes and standards for the various uses of mechanical refrigeration. Said Mr. Lichtenberg:

"Codes and standards which have been developed independently by the ASRE, or jointly by ASRE, and others cover only fundamental engineering standard or broad industry code requirements.

"The increasing specialization occasioned by the wider use of refrigeration, suggests additional items for standardization.

"Consider, as one example, drinking water coolers. They represent a very substantial annual business yet there is no established standard for determining their capacity. True it is that their refrigerating capacity can be

(Concluded on Page 12, Column 4)

McLaughlin Manages Temprite Sales

DETROIT—Appointment of H. B. McLaughlin as sales manager of Temprite Products Corp. was announced this week by John Wyllie, general manager of the company.

Mr. McLaughlin, who joined the Temprite organization in 1933 to take charge of sales in the Chicago territory, has since September of that year been in charge of factory engineering for the company.

Educated at Ohio State University, Mr. McLaughlin began his work in the refrigeration field with Frigidaire Corp. in 1926, being employed in competitive test work in the company's engineering department.

In 1930, he joined Grigsby-Grunow Co., Chicago, to take charge of inspection and testing of the company's rotary compressor. Later he was placed in charge of one of the company's plants.

In 1932, Mr. McLaughlin joined Knight Soda Fountain Co. to do engineering and field service work. He came to Temprite from this position a year later.

Old Issues Raised At Hearing on N. Y. Code

By Phil B. Redeker

NEW YORK CITY—After a short but well-attended public hearing in the Municipal Building here last Friday, the New York City fire department code relating to refrigerating systems became one step nearer final adoption, but with seemingly less agreement on some points than was evidenced at hearings a year ago.

There was standing room only in Room 1013 of the Municipal Building shortly after the hearing got underway, but Deputy Commissioner F. X. Giaccone seized upon the first lull in the discussion to declare an adjournment with the announcement that "another executive session of the board, and possibly another hearing" would be held before the code goes to the Aldermanic Board.

Two most important things brought out at the hearing were:

1. There was no indication of any tendency on the part of those writing the code to further "liberalize" provisions restricting the use of refrigerants which are not classed as non-inflammable or non-irritant—or for that matter, the liberalizing of any provisions of the code.

2. Use of soft solder is definitely prohibited, and since C. K. Michaels declared at the hearing that he was adding a provision which would permit the use of solder with a 1700° melting point, this would seem to bar anything but straight silver solder.

Claiming that in the four accidents in New York City in the past year where refrigerants were involved that one system had been charged with sulphur dioxide, one with methyl chloride, one with Freon, and one with carbon dioxide, A. H. Eustis of the Virginia Smelting Co. again made a plea for less stringent provisions on those low pressure refrigerants which the code classes as flammable and irritant.

Mr. Eustis cited the accident record for the past year as a supplement to a record for several years past covering deaths caused by sulphur dioxide which he submitted last Spring.

Also brought up by Mr. Eustis was the matter of whether the code was not setting up a monopoly for the Freon group of refrigerants, because the restrictions placed on the use of other refrigerants made it impossible for systems using such other refrigerants to be considered because of their excessive cost of installation.

W. W. Rhodes of the Kinetic Chemicals, Inc., supplier of the Freon group of refrigerants, challenged Mr. Eustis on the reference to the New York City accident in which Freon had been involved. He declared that an impartial investigation had disproven the statements made in newspaper stories after the accident.

Mr. Rhodes also declared that Kinetic Chemicals did not want, and did not need, business obtained through regulatory measures.

One of the most vociferous objectors to the code at the hearing was J. C. Coyle, New York City consulting engineer. He started a long argument over Provision Z-5 of the first section of the code (definitions) which reads: "Air Cooling: Cooling of air for human comfort by means of a refrigerating system and/or brine and/or water."

His objection to this was based on the fact that this provision made the code applicable to air conditioning systems using water only, despite the fact that the code seemed to be expressly written to govern mechanical refrigeration systems.

There was considerable discussion of this question by both the board and those attending the hearing, with a great many present feeling that the code should govern systems using water only, because of regulations regarding ducts, fans, etc.

However, Commissioner Giaccone seemed to lean towards Mr. Coyle's viewpoint.

Mr. Coyle also thought that the code ought to be changed to allow replacement of old systems without complying with the terms of the code. As the code is now written it is not retroactive, so that an old system, such as one used in a department store, for example, does not have to be changed. However, if the equipment (Concluded on Page 2, Column 5)

Heads F-M Promotion



JOHN S. GARCEAU

Garceau to Direct F-M Advertising

INDIANAPOLIS—Appointment of John S. Garceau as advertising and sales promotion manager marks the first step in the Fairbanks, Morse & Co. home appliance division plans for a more extensive and coordinated advertising and sales promotion program in 1937. W. Paul Jones, general manager of the division, announced last week.

Mr. Garceau, a pioneer in electric refrigeration advertising work, brings to Fairbanks-Morse a well rounded experience in advertising of appliances, having been with Kelvinator Corp. for the past 10 years.

From 1927 to 1930, Mr. Garceau held the position of sales promotion manager. His next position was that of advertising manager for the domestic division. In 1934 Mr. Garceau was appointed advertising manager for the newly created air-conditioning division.

He was soon promoted to advertising and sales promotion manager for all commercial divisions, which position he held until becoming associated with Fairbanks, Morse & Co.

As assistant to Mr. Garceau was appointed Paul H. Eckstein, who comes to Fairbanks-Morse from the radio division of the General Electric Co., with which he was associated for the past three years as managing editor of technical publications, and supervisor of a national radio service station plan.

From 1927 through 1933 Mr. Eckstein was connected with the Grigsby-Grunow Co., in charge of shows and exhibits.

3 Regional Representatives For Leonard Appointed

DETROIT—W. R. McAllister, Don C. Rulo, and William J. Geiger have been appointed regional representatives of the merchandising division of Leonard Refrigerator Co., according to announcement by R. I. Petrie, sales manager.

Mr. McAllister represents the southeastern district, and will headquarter at Atlanta; Mr. Rulo, midwestern representative, will operate from Fort Wayne, Ind.; Mr. Geiger, in Philadelphia, will represent the Middle Atlantic district. All three men will work under the immediate direction of E. R. Berkeley, Leonard's merchandise manager.

Reeve Named Asst. Head Of Household Sales For N. Y. Frigidaire

NEW YORK—W. Homer Reeve, formerly department store representative for Frigidaire Corp. in the eastern territory, has been named to a newly created post as assistant to K. L. Saunders, manager of household sales for Frigidaire's New York City branch, it was announced last week.

At the same time, it was announced that J. F. Barry of the branch had been given increased duties, with the title of distribution manager.

Methods of Handling Trade-in Units Debated by Department Store Executives at G-E Clinic

Leonard Distributors Convene Thursday to See Models for 1937

DETROIT—Five hundred Leonard distributors and distributor representatives will meet with factory officials here on Thursday and Friday of this week to preview the 1937 line of Leonard household electric refrigerators and hear an outline of the sales and advertising plans back of the product for next year.

The meeting will open at the Scottish Rite Cathedral in the Masonic Temple at 9:30 a. m. on Thursday, and will continue throughout the day, with luncheon at the temple and a banquet that night in Book-Cadillac hotel.

George W. Mason, president of Leonard, will outline the company's policies for next year; H. W. Burritt, vice president, will discuss the business outlook for 1937; R. I. Petrie, sales manager, will introduce new models and explain sales plans; and Walter Jeffrey, newly appointed advertising manager, will present the 1937 advertising and sales promotional program.

Leonard has recently enlarged its field organization through the addition of several new outlets, and many of those present for the meeting Thursday will be attending their first Leonard sales convention.

Friday's program will be devoted to conferences between distributors and factory officials.

U.S. Supreme Court Upholds Price Law

WASHINGTON, D. C.—Upholding state legislation which prevents retailers from selling standard trade marked articles at prices less than those fixed by manufacturers of the articles, the U. S. Supreme Court early this week handed down unanimous decisions which held that the "fair trade" measures enacted by California and Illinois were constitutional.

Nine other states—Ohio, Iowa, Maryland, New Jersey, New York, Oregon, Pennsylvania, Washington, and Wisconsin—have similar statutes.

Justice Sutherland, who delivered the decisions, said that the "sole purpose" of the laws was "to afford a legitimate remedy for an injury to the good will which results from use of trade marks, brands, or names."

"There is nothing in this legislation," said Justice Sutherland, "to preclude the purchaser from removing the mark or brand from the commodity—thus separating the physical property, which he owns, from the good will, which is the property of another—and then selling the commodity at his own price, provided he can do so without utilizing the good will of the latter as an aid to the end."

Detroit ASHVE to Discuss Summer Cooling Standards

DETROIT—"Cooling requirements for summer comfort air conditioning," is the subject of the paper which S. S. Sanford of the Detroit Edison Co. will present before the December meeting of the Michigan chapter of American Society of Heating and Ventilating Engineers to be held next Monday, Dec. 14, at the Wardell hotel.

The paper is a report of a simultaneous study conducted by the Ontario Research Foundation, Agriculture and Mechanical College of Texas, and the Research Laboratory of the ASHVE society.

Questions discussed in the report include: What are desirable atmospheric conditions? How may comfort conditions be measured? How does it vary with different geographical locations? What are the allowable variations in effective temperature? and, What effect does clothing have on desirable effective temperature?

Refinish Used Models and Give Them Resale Value, Dallas Man Suggests

By T. T. Quinn

CLEVELAND—The handling and sale of electric refrigerators accepted as trade-ins is becoming a major problem with department store executives throughout the country, it was indicated by discussions at the Fifth Annual General Electric Merchandising Clinic at Nela Park last Wednesday and Thursday.

Most spirited discussion of the conference followed the speech by Norman Freeman, divisional merchandise manager of Titcher-Goettinger Co., Dallas, in which he related how his firm, through maintenance of a repairing and repainting service, makes money on trade-in units.

"The trade-in problem is approaching," Mr. Freeman said, "and we are preparing to meet it by repairing our used refrigerators and giving them a resale value. This market is going to become increasingly important, and we are just now getting ready to be able to handle it."

Mr. Freeman's statement that his company is "inviting that type of business today" evoked from other department store men present a chorus of requests that he explain how his company handled trade-ins.

Replying, the Dallas department store man said that:

All appraisal work was turned over to the appliance sales manager, so that a standard of comparative trade-in values might be established by him through experience in dealing with different cases.

After inspecting the refrigerator offered as trade-in material, the sales manager's policy was to offer approximately half of what he thought it might bring for resale.

On a \$200 refrigerator deal, where a used electric unit is offered as part payment, the sales manager offers \$25, if in his opinion the unit, when repaired, will sell for \$50.

In all cases, the value of all units traded for is kept low enough that they may be sold under \$100.

"There is a huge market for used electric refrigerators selling under \$100, if you have the stock for sale," Mr. Freeman said. Another method the store uses to push sales of used stock is to withhold the salesman's commission on the new refrigerator deal until the used unit is sold. This, in Mr. Freeman's opinion, keeps salesmen interested in disposing of the used stock.

Financing of used units is handled the same as for new ones—through the Titcher-Goettinger main store, Mr. Freeman said. However, no guarantee is given on the used units.

Later in the discussion of trade-ins, Ralph C. Cameron, assistant sales manager of General Electric's appliance and merchandise department, recalled that in one western city all the trade-in business is handled by a single dealer, who handles nothing but used units. All dealers in the city refer used refrigerator owners to him, Mr. Cameron said.

The used refrigerator dealer makes the appraisal, subject to approval by the dealer selling the new unit, calls for the used refrigerator, and carries it to his own place of business for repair and sale. Dealers handling new merchandise in the city have entirely eliminated the handling of used refrigerators through this method, Mr. Cameron said.

(Concluded on Page 10, Column 1)

Constantine Appointed Mills Chief Engineer

CHICAGO—Arthur R. Constantine has been appointed chief engineer of the refrigeration division of Mills Novelty Co., according to an announcement made by Herbert Mills, treasurer of the company.

For the past four years Mr. Constantine has been chief engineer of refrigeration for General Household Utilities Co., manufacturer of Grunow refrigerators.

Dallas Department Stores Finds Branch Operation on Appliances Profitable

By T. T. Quinn

CLEVELAND—Results of an unusual experiment in department store appliance merchandising—the operation of branch appliance stores—were outlined to department store executives at the General Electric Merchandising Clinic by Norman Freeman, divisional merchandise manager of Titcher-Goettinger department store, Dallas.

The company has been operating four branch appliance stores since April of this year, using them only as display and sales quarters, with delivery and financing being handled through the department store itself.

Although it entered the branch store merchandising field with skepticism, Mr. Freeman said it had enabled the store to do three important things:

1. To lead in new things.
2. To dominate the appliance field in Dallas, a cosmopolitan city.
3. To build additional good will for the main department store.

When it entered the appliance field four years ago, Mr. Freeman said, Titcher-Goettinger, frankly, wasn't overly fond of the idea. The store, he said, got into the business primarily because it seemed the thing to do—customers rather expected it.

Having a name in Dallas and environs, the store decided to try to capitalize on it to the full. Accordingly, Mr. Freeman said, the company tried merchandising refrigerators under its own name—with the result that first year sales were nil.

That experience taught the store two important things:

1. The fact that the store needed a "top" line if sales were to amount to anything.

2. That specialty sales tactics were required.

Doing those things, the store soon rose to the dominant position in appliance selling in Dallas, Mr. Freeman said.

"Curiously enough," he added, "we discovered something more—that a dominant department, such as our appliance department grew to be, was a distinct help to other departments in the store. People who came to our appliance department stopped to buy at other spots in the store, too."

"There are many evils in appliance merchandising. With experience, we learned how to take advantage of the good in appliance selling, and how to eliminate the bad."

"One of our first problems was in attempting to plan a budget for operation of the department. In our efforts toward this, the seasonal trend of appliance sales presented a major difficulty. So we attempted to set up the department so that the sales curve would be more nearly level throughout the year."

"Another problem was that of personnel. Salesmen we hired in January, we found, were quitting in August to take up some other line of activity. The sales force which we built up during the winter months was melting away toward the end of summer, simply because the men had nothing to do."

"In our earliest days in the appliance business, our salesmen used to rely on floor traffic for the great majority of their leads. As time went on, however, we noticed that floor traffic in the department was getting lighter, and that fewer men were required to handle this side of the

work. Three years ago we had eight men on the floor. The next year, we decreased this number to six, then to four, and last year we handled floor traffic with a staff of three men.

"We found that most deals were being closed in the homes," Mr. Freeman said. "That included both cash and credit sales. The store was being brought to the customer, instead of the customer being brought to the store."

"After studying the situation for some time, we decided that the only way to continue our domination in the appliance business was to get out into the community and set up small stores in the neighborhood districts. There, we decided, we would have a chance to get at the housewife-prospect as she came down to those smaller centers to do her daily shopping."

"Most housewives, we found, couldn't take time to come all the way downtown to do their shopping—they were too busy. So the solution lay in taking the store to her, in making it easier for her to see our merchandise and hear our sales story."

"We thought we might solve the problem by taking on more men for outside selling work—but we found they only got in each other's way. Finally we decided on branch stores, and in April of this year we took over the four General Electric branch stores in Dallas."

First thing the company did, Mr. Freeman said, was to broaden its lines to include the all-electric kitchen. Women want freedom, he said, and are willing to buy and pay for kitchen luxuries. Recent improvements and developments in appliances have opened a new room in the home—the kitchen.

Larger sales are there, too, Mr. Freeman said—most of them run from \$800 to \$1,200.

"The electric kitchen holds the largest dollar potential in the whole electrical appliance field, if stores will go after it," he added.

"It keeps salesmen busy and happy, and enables the dealer to obtain the best ones available. They know they'll make money all year, and not for just a few months."

"It also enables the store to recover a lot of its lost floor traffic. People will come in to look at a model kitchen, and expose themselves to other articles offered for sale in the store."

Stores selling the electric kitchen should set up a model kitchen, Mr. Freeman said, with a home economist on hand to instruct interested housewives in the "how's" and "why's" of operation.

Operation of the branch stores, as outlined by Mr. Freeman was as follows:

The stores are sales stores only. Only display stocks of appliances are carried, with deliveries made out of the department store's main headquarters downtown.

Heading the branch store system is a sales manager. Each store is under management of a supervisor, responsible to the sales manager. Working with the supervisor in each store is a limited number of men—"few and good," Mr. Freeman said. Usually about 40 men are employed as salesmen. (At present, 33 men are working for the stores, compared with seven or eight when the company had no branch stores.)

A unified service and installation department is maintained, serving all stores. In addition, a complete repairing and repainting service is maintained for used refrigerators.

"The trade-in problem is coming fast," Mr. Freeman said. "Our defense against it is to fix up the used refrigerators we take in, and give them a real resale value."

"We have found there is a real market for electric refrigerators selling under \$100. If we take in a refrigerator at \$50, for example, and spend \$10 on repairing and repainting it, we find no trouble at all in disposing of the unit at around \$80."

"Today, we're inviting trade-in business; we used to run away from it. We have found that we can trade-in refrigerators, and make a profit doing it. The replacement market is going to become an important one, and we're getting ready for it now."

In practice, the branch store idea worked out quite differently than in theory, Mr. Freeman said. He outlined some of the changes necessary in the personnel setup:

"Some of our salesmen, who were good at selling electric refrigerators, refused to sell anything else," he said. "So we found that an entirely new type of salesman are required for our stores. We needed 'kitchen salesmen' instead of 'appliance salesmen'—men who could sell all appliances, or either of them, with equal proficiency."

"Because of this change in our requirements, we had to let some of our older men go. Now we're hiring green men, men who are willing to learn and to work. We've rid ourselves of the salesmen who 'knew it all.' As a result of our branch operation, and the staff of 'kitchen salesmen' who man the stores, ours is a rounded out business—good the year around, and not just in certain seasons."

The financial operation of the stores was described by Mr. Freeman in this

Personalities at ASRE Conclave



(1) Charley Logan of York Ice Machinery's Philadelphia office is remembered as the man who kept things running so swiftly and interestingly at the spring A.S.R.E. meeting of the past June at Skytop, Pa. He also took an active part in the convention proceedings last week. (2) Harry Williams of Frigidaire, new A.S.R.E. president. (3) D. P. Heath of McCord Radiator, a "regular" at national A.S.R.E. conclaves. (4) R. J. "Tommy" Thompson, well-known chief engineer of Kinetic Chemicals, Inc.

manner:

Rent (including heat, light, and phone) 4%.

Sales commission 10%.

Supervisory expense 4 to 5%.

Sales manager expense 2 to 2½%.

Toughest competition the store had to face this year, according to Mr. Freeman, was from an agency selling gas refrigerators, which offered them to the buying public at terms of no down payment, with four years to pay.

Titcher-Goettinger met this competition with the same terms on electric refrigerators, Mr. Freeman said, and suffered few losses in sales. Not many sales, however, were made on the four-year contract.

"We didn't like the four-year terms," said Mr. Freeman, "so we got around them by scaling our salesmen's commissions according to the length of the customer's time payment contract."

"For sales with a time payment scale of one year we paid the salesman a commission of 12%. If the contract called for two years, the salesman received 11%; for a three-year contract, 10%; and for four years, 9%. So it was up to the salesman to increase his own earnings by selling on shorter terms."

"Most of our men did just that."

N.Y. Code Changes Are Debated

(Concluded from Page 1, Column 2) becomes entirely obsolete and needs replacement, the new system must comply with the terms of the new code. Mr. Coyle did not think this was right.

Apparently, however, this was the intention of those who drew up the code. Mr. Coyle was informed by the board.

R. E. Brizzolara of the R. B. Engineering Co., New York City firm of consulting engineers, offered the argument to the board that certain refrigerants designated as non-inflammable under the code were miscible with oil and therefore flammable under conditions of fire or explosion. Because of this, he said, the definition of a flammable refrigerant in the code isn't all-inclusive.

Reply to this contention was made by C. R. Neeson, Airtemp, Inc., and others on the grounds that Freon refrigerants aren't any more soluble in oil than other refrigerants, and that the refrigerant would escape from the oil under any conditions in which a safety hazard might be involved.

A FREE BOOKLET

"Hints on Cutting, Flaring and Bending Copper Tubing"



(This is the booklet reprinted in part on page 24 in this magazine.)

Here's a booklet that fills a widespread need in the electric refrigeration field for both local service organizations and manufacturers.

It is written for the practical man in non-technical language, clearly illustrated. Send for your free copy. It may save you much time and money.

Most Electric Refrigeration Manufacturers, as well as service men, have found by experience that there is a decided difference in copper tubing. Wolverine, with over twenty years experience in the manufacture of "Tubing exclusively," offers you copper tubing that is clean, thoroughly dehydrated, deoxidized and uniformly soft. These are a few reasons for its preference. Give it a trial.



WOLVERINE TUBE CO.

1413 Central Avenue Detroit, Mich.
Cable Address "Robns-Detroit"

EXPANSION VALVES

ABSOLUTE PROTECTION AGAINST SERVICE FAILURE

Mechanical failure of expansion valves to function under varying conditions is, directly or indirectly, responsible for the great majority of service troubles.

You can eliminate this costly hazard by specifying A-P Thermostatic Expansion Valves on every application of thermostatic control.

A-P Thermostatic Expansion Valves may be installed in any position, or in any temperature, even though higher or lower than the bulb.

AUTOMATIC PRODUCTS CO.
121 Broadway Dept. E2
Milwaukee, Wisconsin

Send coupon below for all the facts.

NAME

ADDRESS

TOWN STATE

Model 210, designed particularly for commercial applications; furnished with flared nuts. Complete range of models, 1 to 15 tons FREON.

"Something"

for those interested in selling

AIR CONDITIONING and COMMERCIAL REFRIGERATION

... and for those buying it

A hundred million dollar business whose phenomenal growth speaks for itself... and yet its possibilities have only been scratched because of the lack of *something* which everyone in the air conditioning and commercial refrigerating industry recognizes as essential.

One Organization offers that "Something"

One organization has it today... has had it for many years... a nation-wide system of factory field support without parallel in the industry. And it is this support which, in a large measure, accounts for the success of present York distributors.

There are 69 York factory branches strategically located, each equipped to give direct *Headquarters* support. Eleven are assembly plants with complete systems of accounting as well as stocks of equipment and supplies.

Here's what it means. As a York distributor you are assured of engineering support, always

at hand, to help you offer any type of *taylor-made* job, *no matter how special*, plus speedy execution of the work and expert *service* to guard your customer's investment. And that results in profit for you and *greater value for your customer*. You need this York *shoulder-to-shoulder* contact, because each installation is different and must be designed for its own particular duty. It is essentially a *contract business* and methods that have proved successful in the automotive, radio and electrical appliance fields cannot be used with equal success in air conditioning and commercial refrigeration.

These unequalled facilities are now available to additional distributors who can qualify for a York Franchise

Briefly this franchise will cover York products having an application to summer cooling or year-round air conditioning for stores, offices, homes and similar installations, including com-

plete automatic heating where needed; also a full line of York refrigerating equipment for markets, restaurants and other users of commercial refrigeration.

In addition, the York franchise will include aggressive merchandising and advertising support, as well as intensive regional training whereby York's cumulative knowledge gained through 50 years of research in mechanical cooling will be made available to York distributor organizations.

If you are interested in a York Franchise

Study the map and notice how directly York backs up its distributors. Picture what an advantage it would be to *you* to have the support of a nearby York factory-branch. Then write and outline the qualifications of your organization and we will give you further details. Address your letter personally to Mr. S. E. Lauer, Vice President, York Ice Machinery Corporation, York, Pennsylvania.

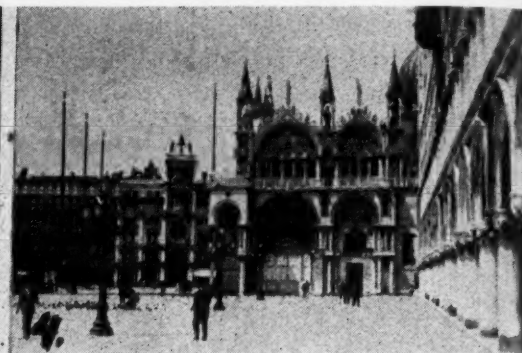
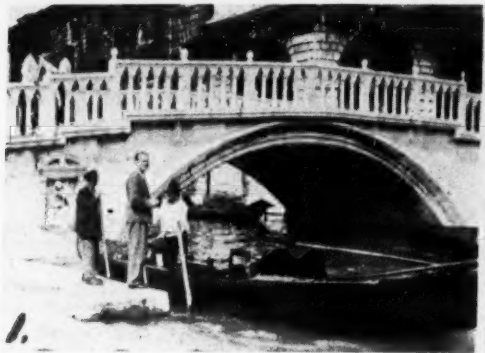


YORK

Headquarters for Mechanical Cooling since 1885

AIR CONDITIONING and REFRIGERATION

Ideal Spot for Honeymooners, Venice Retains Its Twelfth Century Glamour



1. The editor bargains for a gondola tour. 2. This graceful span bridges the Grand Canal. 3. The air is filled with flapping and fluffing when something scares the pigeons of St. Marks. 4. Looking down toward St. Mark's cathedral from the entrance to the Palace des Doges (which appears at the right extremity of the picture).

Around the World

With George F. Taubeneck

This is the 50th instalment of the "World Series" articles by the editor of AIR CONDITIONING AND REFRIGERATION NEWS, based on his seven months' trip around the world this year.

Reactions from subscribers (and subscribers' wives and families!) to this series indicate that the travelog material has even more general interest than the strictly business-like reports on refrigeration and air conditioning in foreign lands. Hence the editor has been encouraged to devote more space to the former.

Milan and Venice, the last two cities he visited in Italy, are treated in this issue. Next week readers may follow Mr. Taubeneck into gay, romantic old Vienna.

American Plan

Dynamic Milan, capital of Lombardy in northern Italy, is the Fascist Detroit, and first commercial city of Mussolini's empire.

From a hub where the famous cathedral is located, curiously modern yet old-world streets branch out into the newer districts where forests of factory chimneys announce the presence of the young industrial Italy.

It is the headquarters of practically every refrigeration firm of any consequence in Italy. And with its neon signs, dazzling theater marquees, heavy traffic, gay crowds, and appealing show windows, Milan is really a sight for American sore eyes glazed by too much history and ruins.

Now a city of over a million, Milan's attractions are headed by the cathedral, built in 1386. Majestically proportioned and meticulously preserved, this gigantic Gothic structure contains priceless religious relics of another day, and has served as a model for many Catholic edifices in foreign countries and in America.

This, ladies and gentlemen, is a cathedral as is a cathedral—one which would inspire reverence and awe in the most pagan of mortals.

The Galleria Vittorio Emanuele, largest covered arcade in Europe, was constructed in 1878 as a monument to peace. It connects Cathedral Square with the Scala Square, location of the world-famous La Scala Opera House, where many Metropolitan Opera Company basso profundos and mezzo-sopranos made their debuts.

Chief marvel for American tourists is the almost unbelievable number of 3,300 statues in or on the cathedral, and its 100 spires which resemble so many gigantic fingers pointed into the turquoise Italian sky.

Art lovers find hundreds of priceless paintings by Leonardo da Vinci and others to marvel at in the Brera Picture Gallery, and in several other buildings throughout the city.

Your footsore correspondent saw just one of these paintings: da Vinci's renowned *Last Supper*, which is now fading away into a damp wall—on which it was painted—of the church of Santa delle Grazie. Although humidity has now damaged this masterpiece irreparably, a good air conditioning installation might prevent total effacement.

San Siro and Mirabello race tracks are on the borders of the city. Such valuable stakes as the 500,000-lire Grand Prize of Milan and the 150,000-lire Victory Stakes are run here at spring and fall meetings.

The enormous Autodrome of Monza, Italy's Minneapolis, is the scene of year-around auto racing. Milan is also near the Italian lake district, Lake Como, Lake Maggiore, and Lake Garda being just a few miles away.

Various wide and well-paved "autostradas" connect Milan with Bergamo, the lake district, and the southern metropoli, and auto traffic on these boulevards is both heavy and exceedingly fast.

Every year, from April 12 to 27, the International Industrial Fair is held in Milan, where exhibitors from all parts of the country and the world bring their products. Of major importance in Europe, this Fair is commended to the attention of all American manufacturers.

Remains of Roman Empire times are common in Milan, the city having been founded about 400 B.C. Many of the ruins have been wholly or partly restored, unlike those of Rome, which are allowed to topple over and rot away.

Venice

It had been raining all the afternoon during the journey to Venice, and the prospect of a dreary evening confronted us. But lo! Upon alighting from the train, the clouds telescoped back down to the horizon, just as if they had been Venetian blinds, and all Venice was bathed in the red-gold glow of a sunset.

Few cities can be so transformed by sunset's magic as Venice. All the arteries of water which criss-cross through the city catch the golden sunrises, rinse them, and cast them upon the walls of the buildings lovingly. The result is phosphorescent, with a tinge of neon.

By day Venice turns out to be a dirty old cluster of back water-alleys, with a bit of a stench to deepen your disillusionment. But in the sunset's radiance she becomes the enchanted city of your imagination.

And by moonlight! When you see Venice underneath a full moon, you know why it is the Niagara Falls of Europe.

The good luck presaged by the miraculous sunset held out for me, the clouds attacked some other portion of the globe, and there was a completely full moon. It would be difficult to imagine a more conducive and propitious spot for a honeymoon than Venice at such a time.

Moonlight Serenade

The sunset's glow lingered caressingly for almost an hour, and I wandered down to the Piazza San Marco, wading through the pigeons, and back past the Palace des Doges up to my hotel, the famous old Royal Danieli. By the time dinner had ended, the full moon was in complete command of the situation, and a gondola certainly was indicated.

Our gondolier was a white-shirted, red-sashed, hairy-chested brigand whose powerful appearance left us totally unprepared for his crooner's voice. But croon he did, and it wasn't bad.

Soon we came to a small barge rocking at anchor out in the sealet between the Campanile and the Isle of San Giorgio. Immediately thereupon the barge's occupants gave out a rollicking rendition of "Funiculi, funicular." We tied up to the barge, and listened to quite a repertoire of popular Italian classics and operatic arias.

With the waves for a sounding board, the singing and instrumentalizing blended like whiskey and bitters, and with the same heady effect!

The musicians appeared to be a family group. One oldster with a handlebar mustache thumped a bass viol (one could say that he thumped a bass *vile*, for he was badly offbeat), three males of assorted ages pinged away on mandolins, two young women

thrummed guitars, and a bustle-bosomed soprano well past forty stood up in the center and carried the lead. Everybody sang—sometimes three, sometimes four-part harmony.

After each two or three songs one of the guitarists—who was both young and pretty, and pretty young—passed the hat, flashing an utterly irresistible smile.

When he signified we had heard enough, the gondolier reluctantly unhitched (he gets paid by the hour, so the songfest had been velvet for him), pushed off, and headed toward the interlocking canals.

Rounding corners gingerly to avoid collisions, backing and filing when one seemed imminent, the gondolier poled us through dark lanes from which the walls of the dwellings rose sheerly, and over which arched bridges resounded spookily with clattering footfalls.

It was a night long to be treasured.

Marco Polo Saw It

After slogging through the jagged spars, odd pillars, and fallen arches which comprise the remains of "the grandeur that was Rome," the well-preserved antiquity of Venice is both refreshing and reassuring. In Rome you are constantly depressed with the miserable brevity of man and man's work; in Venice you are continually impressed with the possibility of glorious permeability.

Nothing is so much Venice as the Piazza San Marco, which is a page from early medieval history come to life—or rather, still living. Lined on three sides by the most magnificent buildings of Venice, it seems like the well-paved courtyard of one huge marble palace. It has remained unchanged since Marco Polo returned from his travels to tell tales of fabulous China.

Approaching the Piazza from the west side, it hits you squarely in the eye. At the opposite end of the famous Piazza, the Church of St. Mark raises its comfortable dome toward the sky; high above all that quadrangular tower of brick, the Campanile stands in all its impressive might, 40 feet at the base and tapering up 350 feet to the tip of its gilded guardian angel.

Venetians and honeymooners walk in this square, and sip coffee in the famous *caffes* surrounding it. It is the assembly-room of Venice.

Here were celebrated all her great triumphs of state; here were mourned all her failures. The pigeons, like showers of silver and black confetti, sift down on the marble statues, then rise and swirl upward again. Feeding them is a favorite tourist pastime.

The Grand Canal—the Broadway of Venice—running through the heart of the city, is about two miles long. This grand *rue* is spanned by three

bridges: the Ponte di Ferro, the Ponte di Rialto, and the Ponte alla Stazione.

Potpourri

If your mental picture of Venice has consisted of a lot of water and a very little land—just enough to accommodate a few necessary buildings—you have another think coming.

People walk around in the streets of Venice just as they do in Detroit, Chicago, and Poughkeepsie. Venetians aren't born with webbed feet, and they don't have to wear hip boots.

Nor do you, the visitor, have to go by gondola to do your shopping for the exquisite leather articles, glass, and decorated textiles for which Venice is noted. You can do your haggling for these in the little shops which crowd the alleyways leading off from the Piazza San Marco.

All day long a steady stream of pedestrians flows over the Iron Bridge spanning the Grand Canal. There are wide streets and narrow streets; rough streets and smooth streets; streets wide enough for the University of Illinois band to march through; streets so narrow that when two people meet one has to edge into a doorway to let the other pass.

Canals? Sure. But streets, too.

Venetians are obliging souls. If you should stop Pietro, or Espero, and inquire (in Italian) the way to the Bridge of Sighs, he wouldn't say: "Two blocks down and turn to left!" He'd lead you there. But don't expect him to understand your English, no matter how loud you shout it.

Kings of leisure, the healthy beggars one meets in the streets seem to have no other home. They eat their meals as they walk along, picking up a bite here and a bite there, swapping snaggles of fish with fellow tramps whom they chance to meet.

Nobody hurries in Venice, least of all the tramps. If our friend Pietro is going some place by boat, and he misses the boat, is he disturbed? Not at all. There'll be another along in a couple of hours. And if he should miss that, there's always tomorrow! What does it matter?

Venice is well supplied with *caffes*. There are Florian's, the Quadri, Bauer-Grunwald, Veneta Marina, Oriental on the Riva, and just a few others. Venetians are not heavy drinkers, and wonder of wonders, we even caught some natives imbibing water!

Like almost everybody, you will enjoy the floating *caffes*. These cook-boats are run by two men: while one is acting as chief cook and head waiter, the other poles the boat along and keeps an eye out for customers. He sings tenor to the effect that all the delicacies outside of heaven are waiting inside.

And even if you don't like Italian cooking, it's worth the experience. If nothing else, eating in a gondola.

(Concluded on Page 6, Column 1)

Pediculous Prisoners, Pampered Pigeons, Packed People, Popular Piazza, Punting Poler



1. After conviction, Venetian criminals are marched from court to prison (right) over the Bridge of Sighs, pictured above. 2. Editor Taubeneck scatters some corn for "St. Mark's pigeons," with the portals of the magnificent old Cathedral del San Marco in the background. 3. There are streets in Venice, as well as canals. Here is one of them: a narrow, crowded passageway lined with shops. 4. At the head of the Piazza stands the commanding Campanile, just as it was when Marco Polo was welcomed home from his travels. 5. Life is a song (but not a dance!) for gondoliers.

AGAIN..LEONARD WILL BE THE "HOT LINE" OF THE YEAR



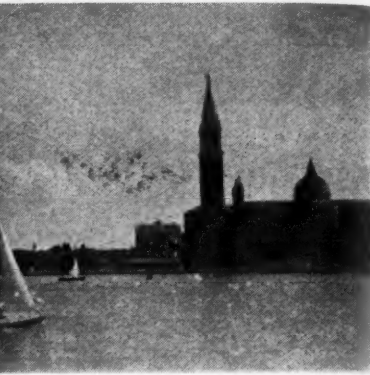
THE LEONARD *Master Dial*

MAKES IT THE GREATEST SELF-SELLER

THAT WAS EVER ON YOUR FLOOR !

And Only Leonard Electric will Have it

The Lido Is Just Another Beach, Deprecates the Editor; But Do Figures Lie?



1. Like a lesson in perspective for elementary art students, this row of dressing cabins stretches into apparent infinity at the Lido, which has a beach as long as it is famous. 2, 3, 4, and 5. Figures to be seen at the Lido, which is just a few minutes by boat from the Piazza San Marco in Venice. 6. From the Palace des Doges, the camera was pointed toward the isle of San Giorgio to capture this serene marine spectacle. Boats pass this island on the road to the Lido.

Around the World

With George F. Taubeneck

(Concluded from Page 4, Column 5)
cafeteria will get you in trim for balancing a plate on your knee at wedding receptions.

What baseball is to Americans, singing is to Venetians. They sing at breakfast; they sing at dinner; they sing at supper; they sing at work. It's all very spontaneous and free, like the music in Hawaii. Noel Coward, who came to Venice for a rest while we were there, is said to enjoy the informal Venetian music more than anything else about the spot.

Also to be heard are the singing street venders. There's the "fish man" who catches his fish, washes them at the water-steps, and winds his way through the streets intoning his wares. Then comes the candy man with his assortment of sweets and with his scales in hand—the Fairbanks variety, not the fish, we mean.

Venetian policemen love to put on the dog. Their self-importance is tremendous, and they flash their finery along the streets, always in twos, strutting like a pair of Thanksgiving turkeys. Seldom do they need to swing into action, for Venice is a peaceful place. Strictly ornamental they are, but entirely in keeping with the scene.

Honeymooners have no monopoly on Venice. There are the artists. You trip over them every place you go. They sit on sea-steps and paint ships; they sit in the streets and paint girls; and they sit any place under the sun and paint the skies.

The children in the streets are no advertisement for a Venetian vacation. They run around without a stitch on, yelling like Indians, and bumping one and all without fear or favor. And they'll steal anything from your shoelaces up.

The Lido

Lido di Malamocco is Italy's most fashionable summer resort, and possibly the most famous bathing beach in the world. It is an island about 10 miles long, bounded on one side by the lagoon and on the other by the sea. The two chief sea-gates of Venice—the Porto di Malamocco and the Porto di Lido—are at each end of the Lido.

This famous playground of Venice and the *haut monde* has a passing fair beach which is generally populated by the wealthy, the beautiful, and the lucky.

Personally, we didn't see what this beach has over almost any other strip of sandy seashore you could name. America's Miami Beach, Australia's Bondi, Honolulu's Waikiki, Bombay's Breach Candy, and the beaches at Monte Carlo and Juan-les-Pins are all much more colorful and glamorous. But perhaps we just didn't know the right people.

In the fall of each year, motion

picture producers from all over the world bring their best films to an international exhibition at the Lido, an event which has become quite a thing. It is then that Lido-Venetian society sparkles with diamond tiaras, monocles are teamed with lorgnettes, and hand-kissing is rewarded with a stiff nod.

Gondola Glamour

The most satisfactory method of sight-seeing in Venice is by gondola, if you don't mind the inevitable argument with the gondolier over his fee. So next morning that's just what we did.

Relaxed in the sunshine, we leaned back in the cushioned seat—feeling like Alex in Wonderland—while the gondolier pointed out the magnificent palaces along the way and related interesting bits of their history.

Starting from the Piazza, we passed the Dogana di Mare (Custom-house), then the Seminario Patriarcale and Santa Maria della Salute. This church was erected as a memorial in honor of the Virgin Mary in the year 1631, on the day that ended the great plague which had swept Venice.

Next we passed the Palazzo Dario, the imposing but unfinished Palazzo Venier, Palazzo Da Mula, Palazzo Lorendon, Palazzo Balbi Valier, and that magnificent structure which Browning held the most beautiful of all Venetian palaces—the Palazzo Mazoni.

Gliding under the Iron Bridge, we came to the Palazzo Contarini degli Scrigni, the home of the Contarini family, which contributed eight Doges (rulers) to Venice.

Then came the Palazzo Rezzonico, in which Browning died; the Giustiniani Palace where Wagner wrote his "Tristan and Isolde." (On the little island of San Lazzaro, between Venice and the Lido, is an Armenian monastery where Lord Byron spent odd moments of his short but turbulent lifetime.)

Saint Mark's

To match some of the great monuments to pagan religions, Christianity offers the Cathedral of Saint Mark's, which fronts the magnificent Piazza San Marco in Venice.

This huge edifice is celebrated throughout the world as the burial place of that great evangelist, St. Mark. It is decorated in the Byzantine style, and built in the form of a Greek cross ringed by an Atrium, which bounds, on the south, the Baptistry and the Cappella Zeno, and on the west, the facade.

The arches above the doorway of the facade are decorated by five mosaics: the removal of St. Mark's body from Alexandria, the reception of the body upon its arrival at Venice, Venetian magistrates receiving the

body in state and devotion, the enshrining of the body in the church of St. Mark's, and the Last Judgment.

Those mosaics, to me, were the first specimens of Christian art which I have ever found interesting—and this is said after viewing the treasures of the Vatican.

A figure of St. Mark stands above the central arch, warrior saints sentry the gables below. In the arch itself are the four famous bronze horses which were brought to Venice in 1204, after the conquest of Constantinople.

Shrined in the arch of the portal in the northern facade is a relief of the Christ Child in the Manger.

Arches of the Atrium are covered with mosaics whose subjects are taken from the Old Testament: The Creation and Fall, the Deluge, Noah, the Tower of Babel, story of Abraham, the selling of Joseph, Joseph's dream, and the history of Moses. These mosaics glitter with gold leaf, shine with enamel, and come alive with the deftness of their execution.

The interior of St. Mark's is even more breath-taking than the exterior. Walls are precious marbles, the floors are inlaid with rare stones, and the vaulting is arched in more of those exquisite mosaics.

Looking back as you enter the great cathedral, you see a mosaic of Christ, the Virgin, and St. Mark. It dates back to the tenth century.

The mosaics in the main body of the church tell the story of the life of Christ. Beginning with the cupola over the High Altar, the Gospel is continued in the various cupolas, and ends with the Last Judgment.

Between the first and second cupolas are pictorialized Passion of Christ, the Crucifixion, the Descent from the Cross, and the Resurrection.

Passing on to the central cupola, which is dedicated to the story of the Ascension, Christ rises into heaven on a rainbow borne by angels.

To the right of the choir, above the organ, are Byzantine mosaics portraying the history of the body of St. Mark after his death.

The High Altar, under which the body of St. Mark lies, is supported by four sculptured columns of Cipolino marble. To the rear of this altar is a second altar with four columns in transparent alabaster.

Behind the High Altar is the Byzantine masterpiece, the famous Pala d'Oro—an enamel painting like a colored glass window, but fashioned instead of enamel, gold, silver, and gems.

The Baptistry is near the main entrance. Here, in the center of the room, is a huge font by Sansovino.

Palace Des Doges

Leaving the Cathedral San Marco, you come to the Palace of the Doges through a sculptured gate—Porta della Carta. Over this magnificent doorway is a relief of the Doge Francesco Foscari kneeling to the Lion of St. Mark. On each side are statues of Hope and Charity, Prudence and Fortitude.

Its courtyard is a blending of Gothic and Renaissance styles. The marble facades of the court are richly decorated with friezes, reliefs, and scrolls. In the center of the courtyard are two bronze well-heads, and opposite

Venetian Religious Mosaics



Here are two snapshots of mosaics which decorate the interior of the Cathedral of St. Mark. Unlike the great religious paintings, these mosaics have withstood the ravages of time and the elements.

the great staircase are statues of Mars and Neptune, guardians of the military and naval supremacy of Venice.

Inside the palace chambers are pictures—hundreds of pictures. Here are found masterpieces of Veronese, Tintoretto, Pordenone, Palma the younger, and Titian. Those Titian women—red-haired, richly complexioned, and full-bosomed!

On the right, as you enter The Grand Hall of the Four Doors, is one of Titian's greatest works—Doge Grimani kneeling before a representation of Faith. Over the windows is Tiepolo's Neptune, offering his gifts to Venice.

In the Anti-Collegio (waiting room) we find the famous *Rape of Europa*, by Veronese. Tintoretto's *Bacchus and Ariadne*, although faded, is still a topper.

Sala del Collegio (Hall of the Ministerial Council) is a glorious room—Veronese outdid himself in painting this ceiling.

In the Sala del Senato we find a magnificent centerpiece by Tintoretto—Venice as queen of the sea. In the same room is another work of Tintoretto: *The Descent from the Cross*.

These old masterpieces, which are so laboriously venerated, show the marks of age, fire, and water; some insist that this does not detract, but rather adds to their interest; but not I, readers, not I.

Once the Glory

It's a surprise to many people to learn that Venice—the glamorous little city built on islands by Roman refugees seeking to escape the invasion of barbarians—was the most powerful nation in the world six centuries ago.

Those "noble Romans" who found a haven on these Adriatic coastal islands soon developed, by force of necessity, into a hardy race. It was natural that they should turn to seafaring for a livelihood, and in this they prospered and waxed mightily in importance.

Geographically, Venice could ask for little. Midway between the East and West of those times, in direct line with practically the whole of northern Italy, she could not help but prosper, once her ships gained mastery of the

trade routes. At the close of the ninth century, she was already top naval power in Italy.

Venice was born a popular monarchy, and swiftly developed into a commercial aristocracy—an aristocracy based upon wealth gained through trade.

The story of the Venetian government is a complete chapter; it ended just as suddenly as it began. Feudalism played no part in the life of Venice; her form of government was wholly her own. Having no lands to inherit, or to be inherited, the only form of aristocracy possible was one of wealth.

When in 1099 Venice joined the Crusades to the Holy Land, she was not prompted by piety alone; she saw how this expedition could be turned to her advantage. Through the Crusades she added considerably to her wealth, and increased her maritime commerce to a near-monopoly.

In the year 1204, with the downfall of Constantinople, Venice became partitioner of the Empire of the East. She had played well the role of the greatest city of Europe; now she was given a more important role, that of its most powerful nation.

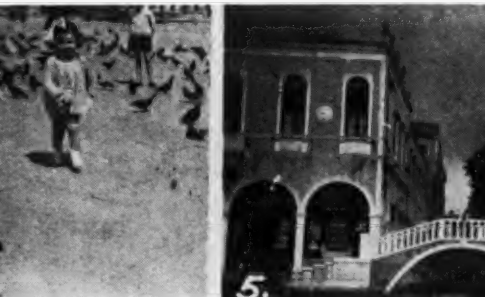
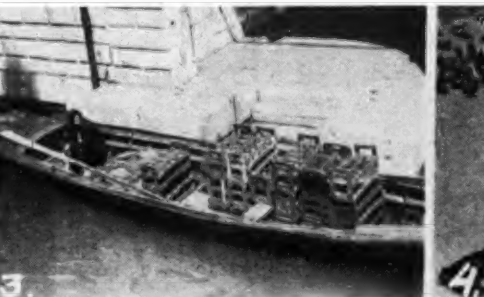
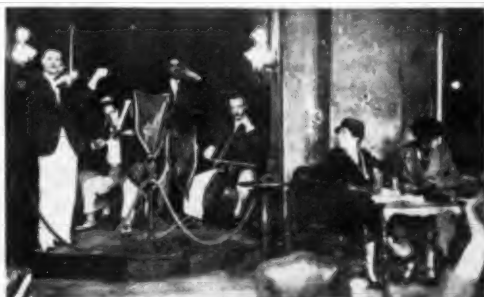
The story of Venice up through the 13th century and a part of the 14th, was one of success and great achievement; and after that one of decline. But not without a struggle and a good fight. At times it looked as though she were regaining her old place; but the core was rotten, the government corrupt.

Unbridled obsession for land had made many enemies. On top of all, Venice lost her monopoly of the sea as a result of the discovery of America, and the longer but safer route around the Cape of Good Hope. America's dawn was the sunset of Venice.

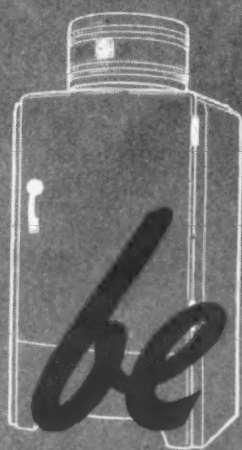
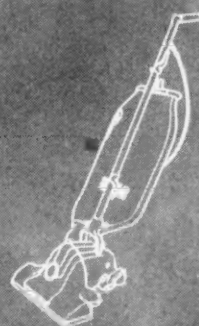
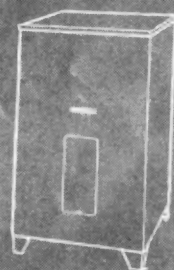
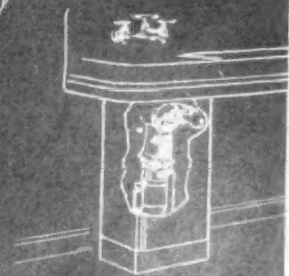
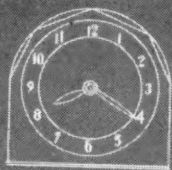
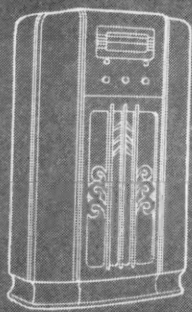
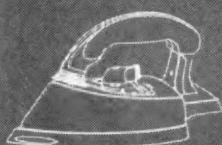
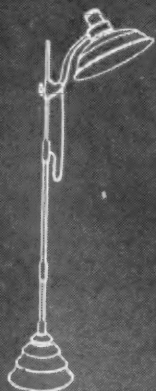
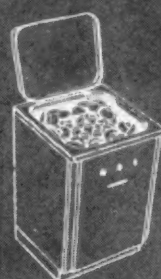
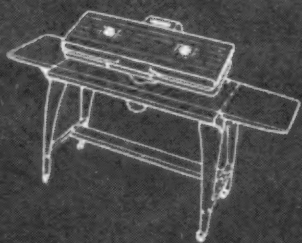
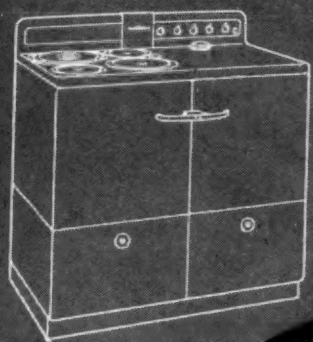
In the year 1797, Napoleon Bonaparte put an end to the Venetian Republic, and Venice became a part of northern Italy.

So passed the power and the glory. From a dream of worlds beyond the horizon, Venice came back to herself—a city still stocked with the stuff of commerce, still strong in men and ships. These she has today, and behind them all, still cherished, the slipper of Cinderella and that yesterday when Venice was the Bride of the Sea.

Venetian Life Presents as Many Facets as Its Physical Appearance



1. Music for the customers of this sidewalk cafe, during the afternoon tea hour in Venice. 2. Not all of Venice is lovely. Witness this ugly canal. 3. Food and necessities are delivered to canal dwellers by gondola freighters. 4. Tiny Amelita doesn't want to play with St. Mark's pigeons any more. 5. Sunset fades into the western horizon, but Venetian buildings still glow with light reflected from the burnished waters. Soon the mirroring canals will cast the moonlight upon whitewashed building walls to make them phosphorescent.



**A Complete Line—
Competitively Priced**

**"1937 is going to be
a G-E year!"**

WATCH FOR THE JANUARY SHOWS!

Small Volume of Dept. Store Sales of Appliances Demands Study, Sweitzer Tells Clinic

By T. T. Quinn

CLEVELAND—Problems facing department stores in the merchandising of major electrical appliances must be studied and solved, if the distribution of these lines is to keep pace with the efficient and economical methods employed in the distribution of other lines of goods to the consumer, Channing E. Sweitzer, managing director of the National Retail Dry Goods Association, told the Fifth Annual Merchandising Clinic of General Electric Co. here last week.

"There is apparently something wrong in the distribution of major electrical appliances, if only 10% of these lines are sold through the department stores of the country," Mr. Sweitzer said. "Perhaps the cause for this condition lies with the department stores themselves; perhaps it is due to methods employed in the marketing and distribution of major appliances over which department stores have little or no control."

To aid in the solution of these problems, Mr. Sweitzer said, a survey will be undertaken by the major appliance buyers' group of N.R.D.G.A. to determine what is wrong, and what, if anything, can be done about it.

Topics to be covered in the survey will include, he added, the number of lines department stores should carry, the question of "private brands," refrigerator guarantees, installment selling, the question of "dealers" who operate without a business location, and whether present mark-ups are sufficient to enable department stores to operate their appliance departments at a profit.

Housing Boom Creating Big Appliance Market

"Few industries today have a brighter outlook for the immediate and distant future than have those engaged in the production and distribution of major electrical appliances," Mr. Sweitzer said. "This optimism is partly based upon the fact that we are confronted with an inevitable nation-wide building boom. The need for new housing in this country is well portrayed by the following facts presented by Saul Cohn, chairman of the housing committee of the National Retail Dry Goods Association, before the Boston Conference on Distribution:

"There are approximately 28 million buildings divided almost equally between farm and urban dwellings. Based upon a 100-year life, 1%, or 280,000, become obsolete annually. There are 500,000 families created every year. There are three and a quarter million homes unfit for habitation. There is a pent up demand due to the low ebb of construction during the last six years. From a peak of three billion dollars of residential construction, we were off nearly 91% during the depth of the depression."

"With the advent of economic recovery, with the restoration of public confidence, with the mounting number of marriages, with the undoubling of families, and with the increase in population, which is expected to reach 133 million in 1940, it has been conservatively estimated that we shall need the erection of 750,000 homes

annually over a period of years in order to meet the housing shortage which was created during the period of the depression.

"I am making brief reference to our national housing problem—which of itself might well be the subject of a session of this conference—because it would be difficult to conceive of any widespread building program which failed to stimulate consumer demand for major electrical appliances. It is difficult to imagine today the erection of even a low cost housing unit in our smallest towns and villages which is not equipped with electric current—making the occupants thereof potential users of the many electrical appliances which are more and more becoming to be regarded as necessities in the households of the nation.

Huge Market in Existing Homes Awaits Salesmanship

"In addition to the potentialities offered by new housing, which augurs a bright outlook for the appliance industry, it has been estimated that there is a five billion dollar potential retail volume—exclusive of air conditioning—in the field of electrical appliances, if the existing homes of this country reach the point of 25% electrification. At the present time, we are told that the annual consumption of electricity in the average home is only 8% of the potential consumption of a completely electrified home of average size.

"Therefore, it is apparent that this potential retail volume of five billion dollars of electrical appliances could be reached if the present use of electric current in American homes were only tripled. Under present conditions, this is an objective which is not unreasonable of expectation, if producers and distributors of electrical appliances undertake sound and aggressive methods to bring it about.

"As managing director of the National Retail Dry Goods Association I am naturally interested in the problem of the merchandising of major electrical appliances from the standpoint of department stores, which largely make up the membership of our association. I was astonished the other day when informed by the merchandise manager of electrical appliances of one of our leading department stores—that department stores sell only 10% of all major electrical appliances; and that the remaining 90% is sold by specialty dealers, public utilities, furniture stores, hardware stores, and miscellaneous retailers which are difficult to classify.

Why Do Dept. Stores Sell Only 10% of Appliances?

"There is apparently something wrong in the distribution of major electrical appliances, if only 10% of these lines are sold through the department stores of the country; and I hope that this statement is not construed as a selfish one on my part. Perhaps the cause for this condition lies with the department stores themselves; perhaps it is due to methods

employed in the marketing and distribution of major appliances over which department stores have little or no control.

"I have discussed quite informally and casually the electrical appliance business with some of our people; and I am convinced that certain conditions and problems exist which need careful study and consideration, if the distribution of these lines is to keep pace with the efficient and economical methods employed in the distribution of other lines of goods to the consumer.

"Accordingly, a survey will be undertaken in the immediate future—conducted by the major appliance buyers' group of the merchandising division of the National Retail Dry Goods Association—for the purpose of determining what is wrong with the distribution of major appliances and what constructive steps should be taken to remedy existing conditions which are retarding their more widespread and profitable distribution. In this survey, we invite the cooperation and help of manufacturers, jobbers, and in fact of all who may have a constructive contribution to make towards the solution of our common problems.

"Since this project lies ahead of us, it might be opportune for me to discuss at this time some of the problems which need consideration and study in the light of my conversation with those vitally interested in the merchandising of electrical appliances.

Factors Affecting Number of Lines to Be Carried

"First of all, there is a question in the minds of some as to whether retailers should carry fewer lines of major electrical appliances. While it is a general principle of good merchandising not to carry too many brands or too many price lines; and to concentrate solely upon brands and price lines which customers demand; nevertheless, it should be a part of this study to determine to what extent retailers should carry few lines or many lines of major electrical appliances.

"There are some who believe that greater concentration of lines will permit more intensive and intelligent sales promotion of appliances; there are others who feel that department stores should carry all well-known brands of electrical appliances in order to meet the widespread demands of their customers created through the effective use of national advertising campaigns conducted by appliance manufacturers.

"There are some who feel that there is insufficient flexibility in the merchandising of major electrical appliances, and that increased volume can only be secured by manufacturers supplying stores with private brands—or unadvertised brands—of appliances for special selling events; or that stores be permitted to reduce reasonably the advertised prices of national brands during such events, if increased volume is to be attained.

Long Guarantees Too Great Burden for Retailer

"Then, there is the subject of guarantees, which, in the minds of many, appear to be reaching the point of absurdity. We are told that—in the case of refrigerators—it is a common practice to give the customer a five-year guarantee, and in some instances the period of guarantee has been extended to 10 years.

"While these guarantees are intended to apply solely to the replace-

ment of mechanical parts, nevertheless the customer interprets them to include all servicing of the appliance—and complaints have even been received regarding chipping of the enamel or porcelain covering the exterior of the box during the life time of the guarantee.

"Of course, these unwarranted long-term guarantees leave the retailer 'holding the bag'; and in order to retain customer goodwill the retail dealer has to make good. It is my opinion that guarantees should be limited to a period of one year; or, at the best, to a period not exceeding the life of a short-term instalment contract of sale under which the refrigerator or appliance is sold.

"If a one-year period is adopted, the guarantee might well apply not only to mechanical defects but also to the complete satisfaction of the appliance in every respect. Such a guarantee policy would be more fair and equitable to retail dealers, and would not encourage customers to make unjustified demands for service and adjustments as is the case at the present time. Therefore, the entire subject of the policy of guarantees will be included within the scope of this proposed study.

Unstable 'Dealers' Are Grief To Established Retailer

"I am told that there are far too many so-called dealers of electrical appliances, who, without much stability in the field of retailing or credit standing, are engaged in the selling of such lines to the public under conditions which breach their agreement with manufacturers or wholesale distributors, and which would not be tolerated if resorted to by department stores, furniture stores, hardware stores, and other well established retailers. These so-called dealers carry no stock, but use the displays of neighboring department, furniture, and hardware stores as their sample and sales rooms.

"It is most difficult for well-established retailers of electrical appliances—whether they be large or small—to meet the competition brought about by the practices of those vendors who sell appliances on a more or less hit-or-miss basis.

"These so-called dealers are not interested in building up the appliance industry of this country. They are solely interested in making a sale now and then—whenever the opportunity presents itself—under terms and conditions to meet the requirements of the particular customer with whom they happen to be dealing at the time.

"I am told that if established retailers of electrical appliances resorted to the methods which these dealers are alleged to practice—then, established dealers would be threatened with the loss of their franchise to handle these lines by producers themselves. This is a situation and a condition on which we hope that this survey will throw light and result in cleaning up any unfair methods of competition which may exist in retail channels.

Problems Connected with Instalment Selling

"We are now in an era of instalment selling; and surely major electrical appliances constitute a line of merchandise which may safely be offered for sale to the consumer on a deferred payment basis. But we must be careful to maintain the credit selling of major appliances—and in fact of all other lines—on a reasonably safe basis.

"Retailers should compete with each other on quality of merchandise and character of service; but I doubt the wisdom and soundness of unbridled competition of credit terms, which will eventually prove to be disastrous to both the dealer and the customer. Credit risks should be carefully selected. A substantial down payment should be required, and the balance due should be payable over a period of time commensurate with the price, amount of down payment, the probable life of the appliance, and the resale value.

"We must bear in mind that if we make our credit terms too easy, we are apt to make our collection problems too difficult. One of the objects of this survey will be to determine what should be sound and reasonable credit terms—safe for the retailer and fair to the customer—upon which major appliances may be sold.

Selling Opportunities Demand Community Campaigns

"I am fully conscious of the fact that there is much room for improvement in the promotion and sale of electrical appliances in retail stores. In handling these lines we are dealing with a highly specialized, and in fact, a highly technical product, which requires a thorough knowledge of the merchandise and how to sell it. I do not think that retailers, as a whole, have even scratched the surface of opportunity which exists for the sale of appliances.

"These opportunities will not be

found at the retail counters alone. They demand well organized and intelligently managed community campaigns reaching into the very homes of the customers. This type of selling requires a well-trained personnel of a very high calibre. In my estimation, an able sales force, well selected, well paid, well trained, and well supervised can be a most important factor in increasing the volume of electrical appliances in the average store.

Present Markets Not Sufficient for Profit

"Now, if established retailers must maintain an able sales force; if they must aggressively and intelligently advertise and promote electrical appliances; if their customers demand credit terms in the purchase of these goods; if the retailer must be prepared to install and service appliances to the satisfaction of the customer—then retailers should have an adequate mark-up on major electrical appliances which will permit them to handle these lines at a reasonable profit.

"I am told that our stores generally lose about 5% in major appliances departments, and yet manufacturers are under the impression that existing mark-ups on these lines are sufficient. In fact, I have been informed that there is scarcely a retailer in America who makes any money in the sale of electric refrigerators, and the only reason they handle them is because their customers demand it. If this situation be true—then both manufacturers and retailers should take steps to correct these conditions, because it is economically unsound to continue to handle any line of merchandise—year in and year out—at a loss.

Survey Will Attempt to Determine Selling Costs

"Accordingly, we shall endeavor to secure through this survey detailed merchandising and operating expense statistics—broken down into various groups of appliances, such as refrigerators, laundry equipment, gas ranges, electric ranges, etc.—in order that we shall have a true picture of what it costs to sell these various appliances and what is a fair and reasonable mark-up for profitable operation.

"We are on the threshold of a great building boom. We have a vast task on our hands in educating the public in the economics and labor savings to be effected through the use of more and more household appliances. We have a potential sales volume confronting us running into billions of dollars, which should challenge the attention and interest of every producer and distributor of electrical items.

"We cannot hope to make the most of this great opportunity unless—through reliable and adequate information—we meet the unsolved problems of marketing appliances and rid the distribution of these lines of the abuses which now exist. It is for this purpose that the major appliance buyers' group of the National Retail Dry Goods Association is about to undertake its research investigation. The problems, which we hope that this survey will shed light on and solve, are more than the problems of retailers—they are the problems of producers and jobbers, and in fact of all who are interested in the economic progress of the electrical appliance industry and in better standards of living for the American people."

Krich-Radisco Outlines Plans to 200 Dealers

NEWARK — Krich-Radisco, Inc., local Kelvinator distributor, outlined its fall and winter sales program before more than 200 dealers gathered in the company's auditorium early last month.

Paul R. Krich, vice president in charge of sales, presided and introduced the various speakers. President Max H. Krich welcomed the visiting dealers, and presented gold watches and pins to those who had earned them through Kelvinator's Pioneer Club.

Reed M. Powell, sales promotion manager, presented details of the coming sales campaign; Pat Collins, credit manager, discussed financial plans; David Wagman, merchandising manager, closed the meeting.

Krich-Radisco's auditorium, completely air-conditioned and equipped with a public address system, a revolving stage, and a domestic economics department, was built expressly for dealer and salesmen meetings.

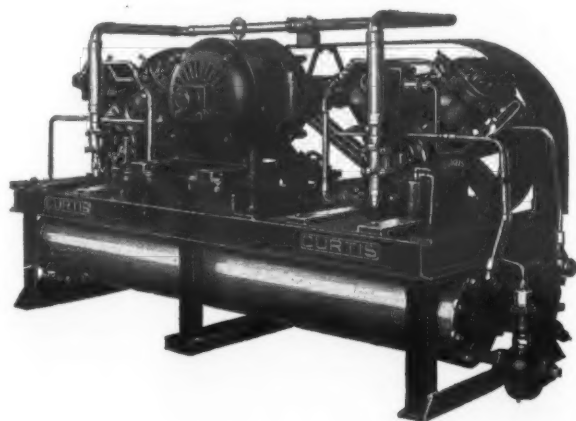
Hamburg Bros. Shows 1937 Line of Electrolux

PITTSBURGH — Hamburg Bros., Servel distributor here with branches in Akron, Ohio, and Wheeling, W. Va., held its annual Servel Electrolux banquet and showing of 1937 models Thursday, Dec 3 at the William Penn Hotel Ballroom. Admission was by invitation only.

AGE ISN'T ALL
... but Experience
is mighty important

BEHIND every Curtis condensing unit stands thirteen years of continuous development, 42 years of experience in making fine compressors, and an engineering and manufacturing background that dates back 82 years to 1854.

Age alone isn't enough, but Curtis' Experience means a great deal today. It means that Curtis condensing units and refrigerating equipment



are carefully and soundly designed—that Curtis standards are the highest in the industry.

Investigate the performance of Curtis products, and you'll see that experience counts a lot.

CURTIS

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue - - - Saint Louis, Missouri

★ ★ ★ *Orders Totaling* ★ ★ ★

\$15,000,000

***PLACED BY DISTRIBUTORS
AT SPECIAL PREVIEW OF
1937 NORGE APPLIANCES***

**Amazing New Line Scores
Smashing Success**

The 1937 Norge Home Appliances shown in a special preview to Norge distributors caused the greatest sensation in the history of the company. Backing their tremendous enthusiasm with \$15,000,000 worth of signed orders, the distributors attending the meeting predicted that Norge would cause the greatest buying wave in home appliances that the industry has ever seen. Again Norge leads with products that sell on sight!

A WORD TO WISE DEALERS: WAIT!

AGAIN NORGE LEADS!

***Enthusiastic Acceptance
Sets New Record***

In addition to presenting products with the greatest natural sales appeal ever found in any complete line, Norge announced the biggest sales promotion and advertising campaign in its history! Alert dealers will fall into line in the Norge Profit Parade immediately. Liberal finance plans make it easy to be a Norge dealer, too.

DEALERS:

MAIL COUPON NOW!

NORGE DIVISION Borg-Warner Corporation
Detroit, Michigan.

Please send me full information on the 1937 Norge line and details of the Norge dealership proposition:

NAME _____

ADDRESS _____

CITY _____ STATE _____

See the Sensational
NORGE
HOME APPLIANCES
Before you Sign Up For 1937

Handling and Sale of Trade-In Units Discussed by Dept. Store Leaders

(Concluded from Page 1, Column 5)

E. M. Lawrence of W. H. Block Co., Indianapolis, in explaining the methods his company uses in handling resale refrigerators, said that experiments with a separate location for the sale of used merchandise had proved so successful that this year an independent sales force had been employed to operate it.

Block Co. has had branch stores for four years, Mr. Lawrence said. Sales in the early days, under the 25 cents a day meter plan, had been so great that the trade-in problem had become apparent long before it reached most other stores, he said.

The store had taken over a separate building for warehousing, and two front rooms in it were remodeled and set up for display of used appliances. The warehouse building was removed from the regular store, so that appliances were viewed only by prospects for used merchandise, and not by those whose attention might be distracted from new appliances, if the department had been housed in the main department store.

Classified Ads Effective

Advertisements were run in the classified columns of Indianapolis newspapers, Mr. Lawrence said, offering the used appliances for sale. Response was immediate and gratifying, and no used merchandise remains very long on the floor.

After establishing the location as an outlet for used appliances, the store hit upon the idea of displaying a line of new refrigerators in the showroom. This plan was successful in turning several would-be buyers of used refrigerators into owners of new models, Mr. Lawrence reported. At present, the store's volume is about 75% new merchandise to 25% used merchandise, he added.

Members of the store's regular appliance sales force manned the store in its early days, but increase in business was such that this year an entirely separate force was put on the job there.

Differ on Branch Stores

Divergent opinions were expressed by department store men on the advisability of setting up branch store operations. Both Mr. Freeman and Mr. Lawrence reported that their operations had proved highly successful, and another executive present, from Elizabeth, N. J., stated that the one branch store operated by his firm had proved an excellent location for night demonstrations to husband and wife when the regular department store was closed.

A. I. Denberg of the Kresge depart-

ment store, however, insisted that the disadvantage of branch stores, from his point of view, was that it hurt business by diverting traffic away from the main store, and into the smaller centers.

Although department store men are on record as favoring shorter guarantee periods, little mention of the problem was made during the Clinic.

C. W. Spiess of Block & Co., Indianapolis, however, suggested that a committee of department store men be appointed to meet with leading refrigerator manufacturers to discuss guarantees and other mutual merchandising problems. No direct action was taken on the motion.

Fairer Division of Distribution Costs Urged by Zimmerman

A more equitable division of the costs of distribution of major electrical appliances was cited as a major need by P. B. Zimmerman, manager of the appliance and merchandising department of General Electric Co., in his summary to department store executives at the close of the Merchandising Clinic.

There has been a general failure in distribution, Mr. Zimmerman said, in that it costs nearly two-thirds of the retail dollar to get the product from the manufacturer into the hands of the consumer. The public has a right to demand, he said, that distribution costs be made as low as possible. A detailed study of distribution methods, with a view toward lowering these costs, is one of the most important demands which the public will make on manufacturers in the future.

A Joint Problem

Distribution is a joint problem, however, he reminded. Division of the costs must be equitable, or permanent benefits cannot be obtained. The department store is the marketing place of America, Mr. Zimmerman declared, and its distribution problems are necessarily those of the appliance industry as a whole.

He praised the part which public utility companies have played and are playing in the introduction of new products to consumers. Utility support of appliances, he said, permits a wider development of the potential market than is possible through the efforts of local dealers alone.

Utility companies, for the most part, would rather see the independent dealer obtain most of the appliance business in their territories, Mr. Zimmerman declared. One of the main reasons for their interest in appliance

sales has been the inability of independent dealers to undertake the financial load incurred by the educational job necessary.

He urged department store men to join hands with utility executives and "go forward together."

As a remedy for misunderstandings between local dealers and the utility company, he urged the formation of electric leagues in all communities of any size, in which dealers and the utility can meet on a common ground, to discuss mutual problems and agree on common practices.

Guarantee Policy Explained

Regarding guarantees, Mr. Zimmerman said that manufacturers of hermetically sealed refrigeration systems were as anxious as anyone else to see the problem finally solved, but that they knew of no better way of protecting purchasers than through exercise of the five-year warranty plan.

"The future of the electrical appliance business," Mr. Zimmerman concluded, "will be in many lines. Already, specialists in each line are developing."

"Ensemble selling holds the key to the department store's big volume in the appliance field. If it is not possible to sell the kitchen all at one time, progressive selling will be the answer—the sale of one appliance at a time, until the kitchen is complete."

"In the future, the electrical appliance department will be the department store's big profit and business volume builder," Mr. Zimmerman predicted.

With their position as leading merchandisers, and their continued promotion of appliances, department stores will eventually become known as a depot of supply, service, and information on all types of electrical appliances, Mr. Zimmerman said.

From this position, department stores will be in a favorable position, later, to merchandise air-conditioning equipment of the package type—and finally, to sell the complete home, he said in closing.

Furniture Stores Will Combat Group Buying, Rau Says

Furniture stores will do all in their power to obtain their share of the "saved up" business in refrigerators and other household electrical appliances resulting from the depression—but several important problems remain to be solved before these stores can enter definitely the profit side of the appliance sales ledger, R. R. Rau, executive vice president of National Retail Furniture Association, told the General Electric Merchandising Clinic.

A recent survey among furniture store members of N. R. F. A. has shown several conditions which hinder the profitable handling of electrical appliances, particularly refrigerators, Mr. Rau said.

One of these, he declared, is the practice of employes buying through industrial concerns at cut prices. This practice was found to prevail in several cities, Mr. Rau said. Aid of local Better Business Bureaus and chambers of commerce has been enlisted to combat the trend, with the result that in several of the larger areas, notably Chicago and Milwaukee, definite steps have already been taken.

Unified Action Needed

"United action against the group buying evil is required—on the part of dealers, distributors, and manufacturers," Mr. Rau said. "Unless definite steps to curb the practice are taken, many furniture stores will be definitely discouraged in their efforts to make money in the appliance business."

Despite the tendency toward destruction of "dealer loyalty" which has characterized the refrigeration industry during the last few years, furniture stores in general report that one line gets the majority of the business, the survey revealed, although two or three brands are handled by the stores, for the most part.

Home furnishing stores are almost unanimous in their desire for a uniform refrigerator guarantee of one year, with two years as the very limit, the survey revealed. Reason for dissatisfaction with long guarantees, Mr. Rau said, was that customers were inclined to demand that the guarantee cover all adjustments and repairs on the refrigerator, and that service be free during the entire length of the time payment period.

Limiting Time Payments

Another matter in which manufacturers can be of assistance to retailers in general, Mr. Rau said, is in limiting the extent of time payment terms.

"There's a limit to playing with fire—and a limit to playing with finance companies, too," he warned. "Manufacturers can, if they will, educate finance companies not to go beyond reasonable lengths in the efforts to increase the range of their business."

"Stretching time payment terms beyond reasonable lengths places an

unfair burden on the retailer.

"Retailers, you know, see conditions through the eyes of their prejudices. Instead of seeing the whole picture, they see only that part of it which is distasteful to them. Until that part of the scene is cleared up, the whole thing, to them, is bad."

Not the least of problems which manufacturers, through their retailers, are facing today is that of meeting mail-order house competition, Mr. Rau said.

"In the smaller communities, and in some of the larger ones as well, the problem of meeting mail-order house competition is today very real," he declared. "It will be interesting to see what refrigerator manufacturers will do about it."

Kimmel Tells How 'Rearranged' Selling Made Radio Profitable

How one large department store has rearranged its display and selling practices to make radio a profitable business was outlined by F. H. Kimmel, manager of the radio department of the May Co., Cleveland.

Recalling the entrance of the department store into the radio selling field as a consequence of the falling off of the phonograph and record business, and the efforts of department managers "to make a real business of what seemed destined from the beginning to be a racket," Mr. Kimmel concluded that "the principal ailment of the retail radio business lies in the fact that the retail dollar is spread too thin among far too many dealers."

Too Many Dealers—Cut Prices

"Practically every evil which exists in our industry today finds its root in this basic cause," he added. "The scramble for the retail radio dollar has reached a point of hysteria, with the result that the radio manufacturer finds the situation out of his control, and the pauperized dealer, either mesmerized by what he thinks is his cleverness or in a desperate last stand, makes offers to the public which can only lead him to the bankruptcy court."

"Into this picture steps the department store. It has a standing in its community. It clothes the family from babyhood to old age; it furnishes the home. It has to be honest in its dealing with the public. It supports the Better Business Bureau, it is a leader in the social and economic life of the community. Properly conducted it becomes an institution in every sense of the word. It welcomes competition as a means of improving its own service. To be complete it wishes to offer its public every commodity which the public demands. And today it finds itself in the radio business, an unwilling ally to a bad situation."

"What can we do to improve it?" "We can, I have found, do much within our own individual organizations to improve the standard of the business. An analysis which was made of the radio department eight months ago in the store where I am employed, produced these interesting observations."

Leave the Bargain Parade

"First: Either in an attempt to keep up with the bargain appeal of competitors, or to lead the parade, our floor display had taken on the appearance of a log-jammed stream. Radio sets were placed as close together as possible and each proudly bore a special price tag. Midget sets were displayed in cases and on tables wherever they could be squeezed in. It was plain to be seen that we were bargain price minded as this was reflected throughout our display."

"Second: Our sales organization had come under the spell of price consciousness and had come to believe that only ridiculous allowances or large cuts would produce a sale."

"These conditions had brought about a shrinkage in the unit sale, volume and mark-up. We concluded that this type of thinking had enjoyed its opportunity and had failed. And we decided to do an about face."

"First we removed all actual bargain merchandise to the rear of the department where we created a special display which we named 'The Bargain Corner.' It is not visible from our main floor display. But customers who are bargain conscious seem to enjoy being led to it."

More Tasteful Displays

"Next we rearranged our fresh new merchandise, attempting to display each set to the best advantage. In many instances we displayed only one or two models where six or eight had been before. It was surprising to us to find ourselves noticing beautiful cabinet lines and fine veneers which had heretofore gone unnoticed."

"We moved all midget sets under \$20 from the main floor display and segregated them from all better sets. These were placed in an especially built up display near our tube and accessory counter, and the sale of them was placed in the hands of the clerks in the accessory department. This move has proven most advantageous, as we are selling more mid-

ets at less sales cost, and our regular floor men are left free to concentrate on the more costly units."

New Attitudes Also Required

"Having thus created a new sales atmosphere, our next task was to develop a new sales technique or a new mental attitude in our sales organization. They had been trained to shop the show windows of the 'gyp' dealers, to shop competitors where they were unknown, to chisel for prices and allowances and to report their findings each day."

"In this attempt to keep abreast of what competitors were doing they had undermined their own morale, and in making our analysis they frankly said, in answer to a query 'What is the greatest factor in making a radio sale?'—'Allowances.'"

"Having taken rather drastic steps in the re-arrangement of our department, we decided to do an about face in our selling technique also. We asked salesmen to forget all illegitimate competition, stopped shopping and turned it over to our own bureau, took them into our confidence about necessity of showing profit, pointed out value of buying from a reliable store, and emphasized the value of our guarantee as above the merits of individual sets."

Technique Effective from Start

"The new sales technique and display proved effective from the start. We soon reached the point of setting conservative allowances on obsolete sets and making profitable deals on trade-ins with resale value."

"In this way, we are striving to do our part in making the business a desirable and profitable one. Others may not agree with us—but we feel it is working. We are selling more sets at higher prices and trying to operate in a manner which will justify us in stealing the slogan of our own St. Louis Store—'When it comes to radios—come to us.'"

Adapt Sales Methods to Local Conditions, Stevens Urges

Sound common-sense reasoning, and not text-book rules, should determine the sales and merchandising policies of the department store's electrical appliance department, George Stevens, appliances specialist of Allied Stores Corp., told the Clinic.

To emphasize the fact that what applies successfully to one store may not be followed with equal success by another, Mr. Stevens cited the following deviations in store practice:

Some stores operate their appliance departments at an overhead of 2½%; for some others, it costs 10% to do this properly.

(Concluded on Page 11, Column 1)

CONDENSERS • EVAPORATORS

FOR EVERY MODERN APPLICATION

Quality and efficiency are the outstanding features of Long condensers and evaporators. Condenser units of tube and flat continuous fin construction, in copper and steel, give maximum heat dissipation per pound of material used, and collect less dust. Available in both domestic and commercial units for electric refrigeration and air conditioning applications.

**LONG MANUFACTURING DIVISION
BORG-WARNER CORPORATION**

DETROIT, MICHIGAN
WINDSOR, CANADA

LONG

KRACK

ENGINEERED

LIFETIME COILS AND UNITS

REFRIGERATION APPLIANCES, INC.

1342 W. Lake Street, Chicago

TEMPRITE

INSTANTANEOUS
BEER and WATER COOLERS

Detroit Michigan

BRUNNER

Send for the New
REFRIGERATION CATALOG

Eight Models of Compressors
Forty-one Models of Highsides
from 1/6 H. P. to 15 H. P.

BRUNNER MANUFACTURING CO.
UTICA, N. Y.

COMMONWEALTH FITTINGS

Built Right to Stay Tight



COMMONWEALTH
BRASS CORPORATION
DETROIT

Selling Policies and Costs Discussed at Big Stores' Clinic

(Concluded from Page 10, Column 5)

Stores differ in their payment of salesmen, and no definite rules can be applied. The only requisite is that salesmen be permitted to earn a living salary.

No definite policies can be established as to how much merchandise stores should carry for successful operation. Some stores operate very successfully with two lines of refrigerators, for example; others may handle as many as five or six different lines and do equally well.

Sales practices, too, differ in successful stores. Some stores make a great success with the brunt of the effort on outside salesmanship; others do just as good a selling job by concentrating on prospects obtained and closed inside the store.

The most important thing retailers can do, Mr. Stevens said, is to keep an "open mind" on the operation of their appliance departments, and be prepared to change their plans and practices as various conditions arise.

The one angle of appliance department operation on which Mr. Stevens found any unanimity of procedure was the service department. Most stores, he said, consider their service departments as important parts of their sales organization, and use it to obtain a large share of their business.

In general, Mr. Stevens said, sound common sense is the best yardstick to use in determining the policies of any store's appliance department.

"Problems vary," he concluded, "and store policies must necessarily vary also, to meet the conditions which exist in various territories."

'Go South, Young Man' Advises Taubeneck

"Go South, young man" was the advice which Editor George F. Taubeneck of AIR CONDITIONING AND REFRIGERATION NEWS gave department store men in outlining to them the highlights of his recently completed around-the-world journey.

Emphasizing at the outset that American department store executives had little to learn from those in other lands about the fine art of merchandising, Mr. Taubeneck recounted several of his experiences in trying to buy things in various corners of the world.

He pointed to Hawaii, New Zealand, and Australia as countries in which anybody with "a good idea and plenty of energy" might amass a considerable amount of money in a comparatively short time.

Java, he said, is potentially a great market for air conditioning, and he cited Tel-Aviv, Palestine, as "an architect's dream." Other countries touched on during his discourse were England, Spain, Sweden, France, and India.

He referred his listeners to the News as the source-book of all the information he had detailed, as well as for a complete report on the journey.

Retailers Who Attended Clinic

G. J. Agnew, The Bing Co., Cleveland; J. G. Aldige, D. H. Holmes Co., Ltd., New Orleans; T. B. Allen, General Electric Co., Atlanta; Leonard Ashback, Goldblatt Bros., Chicago; F. H. Ashby, W. M. Whitney Co., Albany, N. Y.; A. L. Atkinson, General Electric Co., Bridgeport.

J. E. Averett, Savannah, Ga.; C. J. Ballus, General Electric Co., Cleveland; A. W. Bailey, Schunemans & Mannheimers, St. Paul; E. E. Bailey, Herpolsheimer Co., Grand Rapids; E. D. Bean, John G. Myers Co., Albany, N. Y.; R. J. Beehler, General Electric Co., Buffalo; C. G. Blackburn, LaSalle & Koch, Toledo.

P. W. Blew, The Fair, Chicago; George Bogie, R. H. Muer, Inc., E. Orange, N. J.; Robert J. Bond, Allied Stores Corp., Chicago; F. R. Brachhold, Kresge Dept. Store, Newark; George H. Brown, Marshall Field & Co., Chicago; Frank Burnside, Fowler, Dick & Walker, Wilkes-Barre, Pa.

F. K. Bybee, General Electric Supply Corp., Cleveland; Ray M. Callahan, Smith & Winter Dept. Store, Lock Haven, Pa.; Clifford A. Carl, Larkin Co., Buffalo; Frank Cashman, G. Fox & Co., Hartford, Conn.; C. H. Collins, W. G. Reynolds Co., Burlington, Vt.; D. H. Cashwell, Meyer's Co., Greensboro, N. C.; D. M. Chris, The Higbee Co., Cleveland; Hayes Clark, G. E. Supply Corp., Bridgeport.

Harrison T. Coe, Famous-Barr Co., St. Louis; R. A. Coleman, Jr., Cain-Sloan Co., Nashville, Tenn.; H. C. Conner, C. H. Yeager Co., Akron, Ohio; Charles Cross, Gimbel Bros., Philadelphia; John J. Daley, Gimbel Bros., Philadelphia; A. I. Davidson, Boutell's, Minneapolis; A. I. Denburg, Kresge Dept. Store, Newark; D. L. Derringer, Crockin-Levy Co., Norfolk, Va.

Thomas F. Dixon, May Dept. Stores, St. Louis; W. Doolittle, Swern & Co., Trenton, N. J.; J. J. Dunne, Marshall Field & Co., Chicago; David L. Edelmuth, Associated Merchandising Corp., New York City; V. C. Ericson, Adam, Meldrum & Anderson, Buffalo; S. E. Evans, Miller Bros. Co., Wilmington, Del.

E. M. Farmer, Gould-Farmer Co., Syracuse, N. Y.; Harry Fish, American Furniture Associates, New York City; A. Fishgall, Meyer Brothers, Paterson, N. J.; James A. Foukal, Sterling & Welch Co., Cleveland; Martin Franklin, Boutell's, Minneapolis; Norman Freeman, Titcher-Goettinger Co., Dallas, Texas; Frederick Fox, Jr., R. H. Macy & Co., New York City; M. J. Freed, M. J. Freed, Chester, Pa.

George W. Fulks, Adam Meldrum & Anderson, Buffalo; Stanley Glaser, Star Radio Co., Washington, D. C.; Thomas Glynn, Jr., The Bing Company, Cleveland; R. J. Goerke, Jr., Goerke & Sons, Newark; Aaron G. Goldberg, C. F. Hovey Co., Boston; Henry Goldsmith, Mandel Brothers, Chicago; Benj. L. Goodstein, Swern & Co., Trenton, N. J.

R. A. Graves, General Electric Co., New York City; Milton E. Haas, Rex Cole, Inc., Long Island City, N. Y.; Frank J. Hable, Schuneman's & Mannheimers, St. Paul; C. L. Harris, New England Furniture Co., Minneapolis; William E. Helps, Hahne & Co., Newark; E. G. Henry, Meyer's Co., Greensboro, N. C.; J. J. Hesen, L. L. Stearns & Sons, Williamsport, Pa.

J. Hertzberg, S. Kann Sons Co., Washington, D. C.; C. L. Hobbs, R. Cooper Jr., Inc., Chicago; H. O. Hope, H. & S. Pogue Co., Cincinnati; G. M. Hornbein, M. O'Neill Co., Akron, Ohio; W. W. Houser, The May Co., Cleveland; Chas. J. P. Howe, Howe & Rogers Co., Rochester, N. Y.; W. R. Hume, Woodward & Lothrop, Washington, D. C.

W. L. Huston, W. L. Stensgaard, Inc., Chicago; C. E. Ingraham, General Elec-

tric Supply Corp., Cleveland; John J. Jacobsen, Stewart & Co., Baltimore; R. E. Jarvis, Lansburgh's, Washington, D. C.; Harry T. Jordan, Associated Dry Goods Corp., New York City; Robt. H. Kieffer, Kieffer Bros., Syracuse, N. Y.; F. H. Kimmel, The May Co., Cleveland; W. B. Kirby, Everett, Ohio.

Julius Kromer, Larkin Co., Inc., Buffalo; E. M. Lawrence, Wm. H. Block Co., Indianapolis; Joseph Levine, Kirby Block & Co., New York City; M. H. Levy, Davidson's Furn. Co., Kansas City; R. J. Lewis, General Electric Supply Corp., Cleveland; D. W. Lorch, Jr., Livingston Furniture Co., Canton, Ohio; C. F. Longacre, L. L. Stearns & Sons, Williamsport, Pa.; Theo. L. Losby, Northern States Power Co., Minneapolis; F. W. Lowry, Lowry Electric Co., Inc., Williamsport, Pa.

Daniel B. Lunt, Jordan Marsh Co., Boston; R. V. MacDonald, General Electric Co., St. Louis; R. W. McCarthy, Sibley Lindsay & Cur Co., Rochester, N. Y.; Norman J. McKirdy, Flint Bruce Co., Hartford, Conn.; N. J. McIntyre, Smith-Bridgman Co., Flint, Mich.; T. P. Magee, Ed. Schuster & Co., Milwaukee; Samuel Marks, Palais Royal, Washington, D. C.; Benj. K. Merryman, J. R. Millner Co., Lynchburg, Va.; Nathan Miller, Miller Bros. Co., Wilmington, Del.

J. J. Miller, The Hecht Co., Baltimore; Otto W. Nelson, P. H. Harrison & Co., Newark; Fred H. Phipps, Ames & Brownley, Norfolk, Va.; A. W. Pickett, National Electrical Supply Co., Washington, D. C.; A. E. Pierce, General Electric Co., Bridgeport; Thos. Pitkethly, Smith-Bridgman Co., Flint, Mich.

A. Porcelain, Jordan Marsh Co., Boston; T. K. Quinn, Maxon, Inc., New York City; J. A. Ramsey, General Electric Co., Buffalo; R. R. Rau, National Retail Furniture Association, Chicago; A. S. Reed, General Electric Co., New York City; Herman Rosenzweig, General Electric Co., Philadelphia.

W. W. Roski, Wilkes-Barre Dry Goods Co., Wilkes-Barre; W. H. Sahloff, L. Bamberger & Co., Newark; J. M. Sammet, L. Bamberger & Co., Newark; H. H. Samuels, LaSalle & Koch Co., Toledo; L. L. Sanders, Harbour-Longmire Furniture Co., Oklahoma City; A. C. Sanger, General Electric Co., Philadelphia; C. J. Savage, New England Furniture Co., Minneapolis; Paul J. Schaefer, Peoples Outfitting Co., Detroit.

Harry S. Schram, Jr., Straus & Schram, Chicago; S. Schlesinger, Allied Stores Corp., New York City; Karl R. Schuele, Fries & Schuele, Cleveland; O. S. Scott, M. O'Neill Co., Akron, Ohio; E. W. Shaw, The May Co., Cleveland; L. H. Simmonds, General Electric Co., Cleveland; F. M. Slaser, General Electric Co., Detroit; James J. Slattery, R. H. Macy & Co., New York City; Harry T. Smith, G. E. Supply Corp., Cleveland.

W. P. Smith, General Electric Co., Philadelphia; C. W. Spiess, Wm. H. Block Co., Indianapolis; F. W. Stageman, Union Outfitting Co., Omaha; George L. Stearns, L. L. Stearns & Sons, Williamsport, Pa.; W. L. Stensgaard, W. L. Stensgaard & Associates, Chicago; Harry I. Stern, Stern & Co., Philadelphia; George T. Stevens, Allied Stores Corp., New York City.

W. B. Stringham, G. E. Supply Corp.,

New Orleans; H. H. Tarrasch, Stix, Baer & Fuller, St. Louis; J. L. Taylor, Electrical League, Cleveland; L. B. Tedesco, Dey Brothers, Syracuse, N. Y.; Dwight K. Terry, Palais Royal, Washington, D. C.; R. S. Terry, J. R. Millner Co., Lynchburg, Va.; C. W. Thomas, Jr., Strawbridge & Clothier, Philadelphia.

C. H. Trueman, A. Polsky Co., Akron, Ohio; Earl E. Upp, C. H. Yeager Co., Akron, Ohio; Howard Van Duzer, Van Duzer Bros., Auburn, N. Y.; E. V. Walter, R. H. Macy Co., New York City; William Warsaw, The Hecht Co., Washington, D. C.; J. S. Waterman, Allied Purchasing Corp., New York City; L. R. Watson, The Emporium, St. Paul; Maurice Webb, Strawbridge & Clothier, Philadelphia.

Elmer A. Weden, J. S. Hale Corp., Manchester, Conn.; L. G. Wesselmann, Bailey Co., Cleveland; L. H. Wharfield, May Stern & Co., Cincinnati; Hugo H. Wheelock, Gardner-White Co., Detroit; E. C. White, Gardner-White Co., Detroit; J. Wicht, General Electric Co., Bridgeport; W. W. Williams, Fowler, Dick & Walker, Wilkes-Barre, Pa.; R. H. Willis, O'Neill's, Baltimore.

C. M. Wilson, General Electric Co., Philadelphia; R. J. Winters, Stix Baer & Fuller, St. Louis; C. L. Witzeman, Wm. Taylor Son & Co., Cleveland; Wm. B. Wolff, M. O'Neill Co., Akron, Ohio; D. K. Wrigley, J. W. Knapp Co., Lansing, Mich.; R. G. Yeager, Jr., C. H. Yeager Co., Akron, Ohio; Channing Sweetzer, National Retail Dry Goods Association, New York City.

L. E. McGivena, New York News, New York City.

Total attendance, 174.

BANG!
"OUCH!" yells Bill Jr.
BUT DULUX JUST LAUGHS at TOUGH GUYS

... and that's one reason why a
DULUX FINISH helps sell refrigerators **FASTER**

DENTING DULUX is a mighty hard job... Even for careening young speed demons. For DULUX is tough! It stands up magnificently under years of hard service and keeps its brilliant, gleaming whiteness.

That's why DULUX finished refrigerators are "naturals" for prospects with children in the house. Many dealers report that pointing out this fact alone has helped clinch plenty of sales.

But DULUX has more than extraordinary durability. It gives women everything they want

in a refrigerator finish... lasting beauty that is resistant to chipping, corrosion or turning dingy with age. And it is extremely easy to clean. Small wonder that more than 3,000,000 refrigerators today are finished with Du Pont DULUX!

Send for a free booklet giving you full details about this remarkable finish. It will give you many a handy selling tip. Write for "Selling Made Easier by DULUX." Address: E. I. du Pont de Nemours & Co., Inc., Finishes Division, Wilmington, Delaware.



LISTEN TO THE CAVALCADE OF AMERICA—EAST, WEDNESDAYS, 8:00 P.M. E.S.T.; WEST, THURSDAYS, 8:30 P.M. P.S.T.

Lindsay Describes Tests on Penetration of Water Vapor Into Refrigeration Insulation

NEW YORK CITY—How imperceptible water vapor tends to travel to the cooler side of insulating material, increasing conductivity and reducing insulating efficiency, thus demonstrating the need for non-hygroscopic insulation, was described by Harvey Lindsay, president, Dry-Zero Corp., at the annual convention of the ASRE here last week.

The Dry-Zero laboratory, said Mr. Lindsay, has concentrated its attention on the subject of moisture in insulating walls. For many years it seemed to be commonly accepted in refrigeration circles that the principal cause of moisture entry into such walls was "air infiltration."

"Such a conclusion was obviously based on a conception of the humidity in the atmosphere as minute globules of liquid water carried directionally by the air," declared the speaker. "Hence the rule was—keep the air from penetrating into the wall and moisture or humidity would not be carried in."

"Oddly enough, in the same breath was admitted the existence of water vapor pressure due to the effects of temperature differentials, but the relation of this latter phenomenon to the ultimate deposit of moisture in the wall was largely overlooked."

Independent Action of Vapor

"Inasmuch as globules of water floating in the air and moved directionally only by the air movement, had no relation to the vapor pressure exerted by the water vapor in the air set up by temperature differentials, dew points and condensation, we realized that we must recognize a marked degree of independence of action as a prerequisite of atmospheric humidity—of the H_2O itself independent of the air movements."

"We had long known, from previous casual experimentation, that a given reduction of the wall exterior's permeability to air does not always produce the same reduction in penetration of water vapor. Again we knew that a container which was airtight (in any measurable quantity) at a low pressure might nevertheless be quite permeable to water vapor."

"These and other considerations led to the expectations that we would find in the so-called 'water vapor'

we were dealing with, a surprisingly fine texture."

Test Procedure

To check this belief experiments were made with a refrigerator shell made of 20-gauge steel, welded throughout and exclusive of door testing airtight at low pressures for 24 hours. The door being removed, evaporator was well sealed in place, thermocouples were installed and tubes and wires led out through door opening. The latter was then covered and sealed with three successive Dry-Zero sealing sheets, tightly asphalted to the shell.

Test of water vapor penetration of this laminated closure indicated 1.4 grams of water equivalent per 24 hours. This sealed shell was put into a test room maintained at 100° F. and 93% relative humidity constantly, while the temperature inside was maintained at a fairly constant average of 50° F. The test lasted 30 days. At the end of that time, the coverings over the door opening were removed and frost on the evaporator and water on the floor of the shell were found to weigh 290 grams or 10½ ounces.

As care was taken to examine welded joints for flaws or cracks, and no such visible points of entry were found, it is evident that the greater portion of the moisture entered otherwise than through the door-opening closure.

Nature of Humidity

Consistent results of numerous tests in this direction brought forth the important concept that *humidity in the atmosphere functions as a gas and one finer or less viscous, and hence more penetrative, than air*," said Mr. Lindsay.

A test was developed that would visibly show two essentials: (1) That water vapor functions as a true gas entirely independent of the air, and (2) that water vapor will penetrate materials more rapidly than air will penetrate them.

Dry-Zero vapometer for measuring water vapor penetration consists of a heavy welded ¼-inch enameled steel box open on one side with the edge faces smoothly machined, and a heavy steel frame to fit this opening and that can be tightly clamped to it.

In test operation, the box is set in the frame jig with its corner bolts, and a tray containing a measured weight of newly dried calcium chloride is put in the box. The material to be tested is then tightly clamped in place.

The assembled device is then exposed for 24 hours in test room No. 1 which is always maintained at 100° F. and 93% relative humidity. At the end of that period the test is opened and the tray re-weighed, the increment of weight being the water equivalent of the H_2O gas (or "water vapor") that penetrated the sheet under tests.

Air Pressure Excluded

This standard test was run with a sheet of clear rubber about 1/32 inch thick, assembling in a temperature of 100° F. so that no air pressure would be involved. The test showed an H_2O penetration of .7 grams per sq. ft. per 24 hours.

The test is then repeated, but with the assembly done in a temperature of approximately 45° F. Upon introduction to the test room, the air imprisoned in the vapometer expanded and stretched the rubber sheet into an outward belly of approximately ¾ in. In other words, during the test the air was endeavoring to force its way outward through the porosity of the sheet.

At the conclusion of the test it was found that precisely the same amount of water vapor had penetrated inward through the rubber sheet as was the case when the air was not trying to penetrate outwardly.

Conclusions from Tests

Mr. Lindsay believes the test shows conclusive evidence of two things.

1. That humidity in the atmosphere subjected to vapor pressure, acts independently of the air;

2. That it is far more penetrative. It must then be obvious, declared the speaker, that "air infiltration" has little or nothing to do with the de-

velopment of moisture in an insulating wall; and further, that unless such a wall were constructed so that it could maintain indefinitely a considerable partial vacuum, it certainly cannot prevent the entry under pressure (vapor pressure) of a still more penetrative gas.

Physical Effects

Physical effects of moisture on insulating materials, according to Mr. Lindsay, that should be eliminated, are principally: subsidence, or structural collapse, and fungic or rotting action, from which odor troubles arise.

The first of these effects is a question of the specific inherent characteristics of the material used, and when these characteristics are unsuitable it is hardly practicable to prevent that effect; but the second can be prevented by minutely uniform impregnation of the material with suitable fungicides. Too often such impregnation commercially is too spotty and irregular to achieve a good result.

As regards thermal effect, increased moisture content of insulation results in increased conductivity. Generally speaking the two principal causes to which this effect has been ascribed are (1) additional heat paths through the insulation by means of continuous water films, and (2) an increased conductance of the air contained in the insulation, due to the increased humidity of that air.

However, on investigation these two factors alone do not seem remotely capable of producing the known result, Mr. Lindsay declared.

Heat Differential

What is involved, said Mr. Lindsay, is a heat differential between the two sides of the material, and consequently heat differential and vapor pressure between the two sides of every cell or interstitial area throughout the insulant.

Humidity or water vapor in these tiny air spaces will travel to the cooler side in its eventually successful effort to reach the nearest dew point and consequent area of condensation and incipient low pressure.

This action results—as the microscope discloses—in concentrating the introduced moisture on the cold side of each minute air space, in the area of the body where dew point has been reached.

This provides a possible explanation for the marked increase of conductivity with increasing moisture content far below any stage of saturation.

Suggested Hypothesis

Mr. Lindsay offered the following hypothesis as to the principal cause of the phenomenon under discussion.

"Suppose we mentally magnify a cell of cork and its air contents a billion times and then step into it. We find ourselves in a chamber shaped something like a small fat Zeppelin, perhaps 80 ft. long.

"But immediately we see that the chamber is filled with millions of sizable solid looking particles constantly flying in every direction, always trying to get away from each other and in the effort, bombarding and rebounding from the chamber walls.

"Returning to the normal view point one may feel a certain surprise to realize that those flying, ricocheting bullets were themselves the air, that they were the molecules of the nitrogen, oxygen, CO_2 , and H_2O .

"In short, the smallest air space in an insulant visible by the most powerful microscope contains millions of freely flying actual specks of what perforce we must call solid matter, and it is those specks which are the air, and the agencies which carry heat across the space when one side of it is warmer than the other.

Surface Differences

"If the tiny walls bounding these air spaces are resilient and smooth, the flying air specks impacting against them have difficulty both in taking on a load of heat agitation from the molecules of the warmer wall and in disposing it to the molecules of the cooler wall. If the walls of the cell or fibre are smooth but sluggish or indentable, the transfer is easier and hence more complete.

"If the walls are rough—full of molecular crevasses and caverns, so that the flying molecules rebound several times before getting away—the speed of transfer is increased. This in brief is a theory which I presented some years ago, and on which our development of insulation has been based.

"It follows from this that wherever we have even the thinnest possible film of water on the solid surface, the flying molecule finds heat transfer or equalization much easier and more complete, because of the indentability of the liquid surface.

Disposition of Water

"In considering the probable effect then, of so many grams of water interposed in a cubic inch of insulating material, it becomes necessary to know how that water is disposed on the minute surfaces of the material. Obviously its effect will be greater if it is in an insulating material

Mills Group at Memphis



Eighteen members of Mills Novelty Co. service group gathered at the Memphis convention recently. Top row (left to right)—C. Capells, A. Dawson, G. Gant, F. Duvall, Joe Leitner, A. Woods, T. Brunton, E. Storms. Center row—R. Duncan, G. Reynolds, M. Bokesch, Steve Leitner, G. Hunter, R. Polley. Bottom row—L. Leitner, D. C. Butts, G. Tiedt, and H. B. Adams.

whose minute internal surfaces have a relatively high 'wetting' characteristic, for in that case it will tend to spread over the surface as a film; where as on such a surface with very low wetting characteristic the water will tend to form in minute globules, covering as little of the surface as possible.

In conclusion Mr. Lindsay said that the study shows two things:

1. That unless we give insulation a warm side covering capable of holding a partial vacuum indefinitely, we cannot exclude water vapor entry, and therefore,

2. For permanent insulation efficiency we must seek for strictly non-hygroscopic insulation.

Engineers Hear Pleas for More Inclusive Codes

(Concluded from Page 1, Column 1)

found that a purchaser imagines that if he buys one water cooler he can operate it continuously and it will cool all the drinking water required by his establishment, even though it may have as many as 500 persons.

"He gives no consideration to the ambient temperature, the incoming water temperature, the kind of work his employees are doing, or the amount of water they consume. He simply thinks that if he buys one water cooler, it ought to be ample for his needs, like the theater proprietor who told one of our prominent presidents, that he thought if he bought a household refrigerating machine and installed it in his theater, he ought to obtain enough cooling effect even though calculations showed he might require the equivalent of 100 tons each 24 hours.

A.S.R.E. Standards

"This brings us to the consideration of application codes or standards. Should the A.S.R.E. sponsor such application codes or standards, or should they be developed by other groups? Fundamentally, I feel that the A.S.R.E. could sponsor any engineering standard or any engineering code which promotes the art and sciences connected with refrigerating engineering.

"It could develop standards which enable manufacturers to rate all kinds of refrigerating equipment, including drinking water coolers, natural convection air coolers, forced convection air coolers, milk coolers, and other nationally recognized equipment to the end that the manufacturer may have a standard for design purposes and the consumer a similar standard for purchasing.

"Beyond this, I believe the A.S.R.E. cannot readily proceed and remain within its recognized sphere of activity."

W. S. Shipley Presides

W. S. Shipley, president of York Ice Machinery Corp., presided at the opening technical session Wednesday morning. Papers presented at this session included "Comfort Cooling in the Research Residence at the University of Illinois," by A. P. Kratz and H. J. Macintire; "Air Conditioning Requirements of Multicolor Offset Printing," C. G. Weber, U. S. Bureau of Standards; "Evaporative Cooling for Comfort," W. L. Fleisher, consulting engineer, New York City.

Chairman of the Wednesday afternoon technical session was A. R. Stevenson, Jr., the General Electric Co. Papers presented at this session included: "A Study of Heat Transfer in Unit Refrigerant Condensers Which Use Evaporative Cooling," by Byron E. James, York Ice Machinery Corp.; "Standards for Use in Refrigeration

Engineering," by Chester Lichtenberg, General Electric Co.; and "Moisture in Insulating Walls," by Harvey B. Lindsay, president, Dry-Zero Corp. Mr. Lindsay's talk is reported on page 12 of this issue.

Meet with A.S.M.E.

On Thursday morning the A.S.R.E. members met in joint session with the American Society of Mechanical Engineers at the A.S.M.E. headquarters. New data concerning characteristics of certain gases was the topic discussed at this session.

H. M. Williams, new president of the society, presided at the Thursday afternoon technical session at which O. S. McGuffey, Kold-Hold Corp., talked on "Truck Body Cooling by Eutectics"; and J. G. Bergdoll, York Ice Machinery Corp., discussed "Freon-12 Thermal Expansion Valve Requirements." Mr. McGuffey's paper is reported on page 13 of this issue, and Mr. Bergdoll's on page 27.

At the Thursday afternoon session Gardner Poole, vice president of Frosted Foods Sales Corp., gave an informal talk on frozen foods and presented a movie showing the various stages in processing of frozen foods.

Consider Absorption Problems

Crosby Field, vice president of the A.S.R.E., presided at the fifth and final session Friday morning which was on the general subject of "Absorption Methods." Papers given at this session were:

"Commercial Refrigeration by Low Pressure Steam," Glenn F. Zellhoefer, Williams Oil-O-Matic Heating Corp.; "The Modern Gas Operated Refrigerator," W. R. Hainsworth, Servel, Inc.; "Silica Gel in Air Conditioning," W. E. Stark, Bryant Heater Co., Cleveland; "The Open Absorption System," Dr. A. A. Berestneff, Carrier Corp. Mr. Zellhoefer's paper is reported on page 22 and Mr. Hainsworth's paper on page 15.

At the final session Friday morning, George F. Taubeneck, editor of AIR CONDITIONING AND REFRIGERATION NEWS, gave an informal talk in which he related some of the experiences of his "Around the World" trip from which he returned late this summer.

SHELF-X

FLAT SURFACED EXPANDED STEEL SHEETS

MAKES BETTER REFRIGERATOR SHELVING

Prove it at our expense



Send for free sample of Shelf-X and make the sliding cup test

Shelf-X has a smooth, flat surface upon which containers can be moved freely without tipping or spilling. Since Shelf-X has no mechanical joints it is sanitary and easy to clean. It supports small objects; yet it permits easy circulation of air.

Also used for Air-Conditioning Screening

Because it has a large open area assuring good air circulation Shelf-X is as good for air-conditioning screening as it is for refrigerator shelving.



Write for free sample and complete details. Address United States Gypsum Company, Dept. 21-ER, Steel Products Division, 300 West Adams Street, Chicago. Manufactured by:

UNITED STATES GYPSUM COMPANY
STEEL PRODUCTS DIVISION, 300 W. ADAMS ST., CHICAGO



Dependable
ELECTRIC
REFRIGERATION

COPELAND REFRIGERATION CORP. Holden Ave. at Lincoln - DETROIT



**NEW
ZENITH
REFRIGERANT FILTER**

Two years of successful operation in the better known commercial refrigerator units has proved the value and efficiency of Zenith Filters.

These units are now available to the Jobbing Trade. No other filter compares with a Zenith.

CHECK THESE FEATURES

Patented Element. Full Line of Sizes. Quickly Cleaned. Easily Installed. Ample Capacity. Positive Protection. Leak-proof. Corrosion Proof.

For use with Sulphur Dioxide, Freon or Methyl Chloride.

ZENITH CARBURETOR CO.
Subsidiary
BENDIX AVIATION CORP.
Detroit, Michigan

Commercial Refrigeration

Truck Cooling by Eutectic Installations and Methods of Estimating & Balancing Heat Loads Discussed by McGuffey

NEW YORK CITY—Truck body cooling by eutectics and correct methods of estimating and balancing heat loads for such installations, were described by O. S. McGuffey of the Kold-Hold Mfg. Co. last Thursday before one of the technical sessions of the annual A.S.R.E. convention.

There have been two attempts to utilize the low cost of direct mechanical refrigeration and the dependable holdover effect of latent heat of fusion of frozen materials in the refrigerated truck field, began Mr. McGuffey. One of these systems was directed toward the freezing, in a stationary freezing room, of low temperature freezing material to supply the required refrigeration for the vehicle during the operating period. The freezing material was carried in containers.

The second system, said Mr. McGuffey, combines the acceptable features of mechanically produced refrigeration with the constant and dependable characteristics of the storage ability or heat capacity of frozen eutectics or cryohydrates.

Few Suitable Eutectics

While many eutectics have been discovered, only a few of these are suitable in range for refrigeration work, and the majority of these few can not be used commercially due to material cost or to lack of stability over a long period of time under commercial conditions, the speaker stated.

"The practical field is therefore closely limited," he continued, "and even on these few suitable materials there are apparently few published data regarding their physical characteristics beyond their density, freeze point, and latent heat of fusion."

"Therefore in order to reduce the theory to practice it was necessary to do considerable experimenting to determine the mixture volume throughout the temperature range encountered, the nature of the ice formed, approximate rate of heat transfer through varying thicknesses of the ice, the tolerability of the mixture to different commercial impurities, and the cause and correction of 'salting out.'"

Volume Characteristics

"While different eutectics behave each in a different way, they generally follow the volume characteristics of water except at their own particular set of temperatures. In other words, the volume of a given eutectic is decreased (density increased) as the temperature is lowered, until the point of maximum density is reached."

"This point is 6 to 9° above the freezing point. Further lowering of the temperature to the freezing point produces slight expansion and during the transition from liquid to solid at the freezing temperature, there occurs the greatest volume increase (or density decrease). Further lowering the temperature very slightly reduces the volume."

Specific Heat of Eutectics

"The specific heat and rate of cooling of the liquid eutectic closely parallels that of water except that it occurs through a lower temperature range. The freezing of the eutectic is not the same as normal freezing of water since few, if any, long needle-like crystals are formed."

"The appearance more nearly resembles the successive applications of white lacquer, so that the refrigerating coil must do its work through a constantly increasing thickness of cryohydrate until the entire mass is solidified. The additional cooling of the ice mass is fairly rapid but of no consequence, due to the low specific heat, which seems to lie between .45 and .5 B.t.u./lb. °F."

Little Effect from Warming

During the heat absorption period, which provides the refrigeration effect with which we are directly concerned, little noticeable effect is secured from the warming of the cryohydrate to its melting point, Mr. McGuffey declared.

Due to the high heat absorption ability, which varies with different eutectics from around 95 to 145 B.t.u./lb., and is the latent heat of fusion of the solvent content plus or minus the heat of solution (negative or positive) of the solute, the actual melting of the cryohydrate is the useful part of the cycle.

The maintenance of reasonably constant container surface temperatures is assisted by increase in solution density for a few degrees above the actual melting point. This gives rise to useful convection currents which carry the heat from the surface to the inner ice mass long after the ice

has lost direct contact with the inner surface of the container.

Rate of Heat Transfer

Other experiments carried on at the same time served to establish that under commercial conditions the overall rate of heat transfer from the air of the refrigerated compartment or body to the refrigerating or container surface varied from 2.75 (good) to 1.25 (poor), say 2 B.t.u./hr. °F. temperature difference (air to eutectic ice), so that from the above the limits of form and design of the actual unit could be established, once the proper heat entry to the refrigerated compartment could be determined.

Calculating Heat Load

Mr. McGuffey explained that it was necessary to set up a method of calculating the heat load in truck bodies from the information available that would meet the majority of requirements. The heat entry, he said, is determined from the outside area of the insulated compartment (inside dimensions plus insulation thickness), the published accepted standard k factor for the insulation employed plus 20% (at 2 inches) to 5% (at 10 inches) to compensate for additional heat entry through frame members, the desired temperature difference (inside to outside at average peak conditions), and an arbitrarily added percentage to compensate for service openings, air entry, etc., which is a matter of judgment in connection with the stated operating conditions.

Roughly, this percentage is 35% (light), 50% (normal) to 100% (very heavy) of the normal heat entry arrived at from the above calculations.

Necessary Balance

"The trend of refrigerated body manufacturers and users towards realizing that a reasonable balance between insulation and refrigerating equipment is a real economy has lightened the equipment specifications to some extent," said Mr. McGuffey, "but the fundamental problem remains the same."

"It is necessary to establish a balance or ratio between heat absorption rate and total capacity of holdover equipment so that the material supplied will not only provide the desired temperature at the beginning of the holdover cycle but will also maintain this temperature with acceptable constancy throughout the desired time of 'off cycle operation' and at the same time provide a reasonable margin of safety for unusual conditions."

"This must be accomplished with a minimum of weight and space, since users of this type of equipment are reluctant to sacrifice any 'pay load' weight or space even in view of admitted economies."

Condensing Unit Size

"The required condensing unit size also must be determined, whether the body is to be refrigerated with an individual unit or is to be connected to the unit as a member of a fleet or in conjunction with already refrigerated stationary equipment such as coolers, storerooms, etc."

"A condensing unit must have sufficient capacity to extract from the system (and the body) the total heat entry for the entire day, which is the heat absorbed by the units during the holdover cycle plus heat accrual during the condensing unit operating time."

"This must take place at a back pressure corresponding to a suction gas temperature sufficiently low to assure complete solidification of the eutectic solution, and in an operating period, sufficiently less than the difference between the desired holdover cycle and 24 hours to take care of unusual conditions."

Figuring Specific Installation

"To be specific, if a body is assumed to be, say 96 inches long, 60 inches wide, and 38 inches high, all inside dimensions, insulated with 6-inch corkboard walls and 7-inch corkboard floor and roof, of normal construction, and intended for road operation of 12 hours in normal delivery service, handling ice cream at 5° F. in an

outside temperature at average maximum of 95° F., the average load during the service period would be about 1,555 B.t.u./hr. and the total service period load would be about 18,600 B.t.u. with a total daily load of about 31,000 B.t.u.

"The hold-over equipment, therefore, would have to handle an average maximum load of 1,555 B.t.u./hr. for slightly more than 12 hours (say 14 or 16, depending on conditions), at a temperature difference between 5° F. and an available eutectic at (say) -8° F. of 13° F., and at an average rate to 2 B.t.u./ft.²/°F./hr. The surface requirements for this condition are therefore

$$\frac{1,555}{13 \times 2} = 59.80 \text{ (say 60) ft.}^2 \text{ exposed unit surface.}$$

"The hold-over capacity would be 14 (or 16) x 1,555 = 21,700 (say 22,000) B.t.u., and the minimum amount of eutectic necessary would be this figure divided by the latent heat of fusion of this particular eutectic (say 110

$$\frac{22,000}{110} = 200 \text{ lb. B.t.u./lb.}; \text{ thus } \frac{22,000}{110} = 200 \text{ lb.}$$

"As outlined above, the condensing unit capacity in this case would be the total daily load divided by slightly less than the allowed operating time

$$\frac{31,000}{11 \text{ (or 10)}} = 2,818 \text{ (say 2,850 to 3,500 depending on conditions) B.t.u./hr., at an average suction pressure equivalent, in this case, to a gas temperature -13° to -18° F. and at a condensing temperature as provided by either air or water conditions at average maximum conditions that would prevail during the period allowed for condensing unit operation."}$$

Frost Accumulation

As with any coil or "low side," the accumulation of frost over the surface very markedly reduces the rate of heat absorption, but the presence of a reasonable amount of frost is considered in the established k factor, and where frost is not permitted to accumulate beyond 1/4 inch in thickness, it remains entirely "dry" and powdery even on "high temperature" (18° F.) units and can be easily brushed or blown off daily.

When brushed off this "dry" frost can be swept from the body so that there is no dripping or wetting of the floor or insulation from this source, claimed Mr. McGuffey.

Connecting the Equipment

Connection of the various units of the equipment conforms to standard practices in many ways, but requires especial attention as to the arrangement of the equipment so that there will be sufficient flexibility in the tubing or pipe employed to accommodate not only the normal expansion and contraction due to temperature changes, but any small stresses induced by weaving or warping that may occur in the body structure itself during road operation, it was explained.

In all cases where the system is refrigerated by an individual condensing unit, low pressure controls are used to disconnect the unit when the back pressure becomes sufficiently low to assure that the eutectic material is completely solidified and ready to absorb the maximum amount of heat.

Use of Low Pressure Cutout

Where more than one truck body system is refrigerated by a stationary condensing unit of either the low pressure refrigerants or ammonia, a low pressure cutout is usually used to prevent undue lowering of the suction pressure and consequent oil lifting, and where the entire fleet is hooked

on at one time, this can also serve to stop the operation, once the solidification is complete.

However, where truck bodies of different characteristics are connected at different times it is most convenient to leave the time of operation to the discretion of the operator in charge of the equipment, who will learn in a short time when any particular unit may be properly disconnected from the system and returned to active service, said Mr. McGuffey.

Preventing Entry of Air

Actual means of making the connection between a fixed machine and mobile unit is through the use of suitable flexible lines of convenient length and mating halves of a union each side of which is provided with a shut-off valve and so arranged that the minimum volume is included between sealing faces of the valves at the time they are connected.

On systems where the incorporation of even this small quantity of air would cause difficulty, an auxiliary valve is arranged as part of the fixture so as to permit purging of the air between the valves by the admission of a very small quantity of refrigerant gas before both mating valves are opened to permit free passage of the gas from the fixed and mobile halves of the system.

Refrigerated Trailer Used By Texas Meat Co.

VERNON, Tex.—Vernon Meat Co. recently put into service a trailer body built by American Body & Equipment Co., Dallas, insulated with Dry Zero and L-K Cork, and refrigerated by two Kold-Hold units connected to a Servel condensing unit. The trailer is used in making store deliveries in rural territory surrounding this town.

SHERER CASE AND COOLER FRANCHISE

offers

BIGGER PROFITS for 1937

TIE up with the Sherer Case and Cooler Franchise for '37... assure yourself of greater profits every month of the year!

The Sherer Franchise gives you *exclusive protected control* of specific territory... offers a background of 34 years of successful, dependable service to retail food merchants.

Sell your retail food store customers **COMPLETE** jobs... with Sherer Equipment. The result... thoroughly satisfied customers... more compressor sales... greatly increased profits.

SHERER 4-STAR FRANCHISE

- Consider the outstanding features that the Sherer Franchise offers you.
- ★ A complete line of CASES and COOLERS, engineered to a high peak of perfection—styled to meet today's demands.
- ★ NEW EQUIPMENT constantly under test and development. A line that is ahead-of-the minute—always a leader in the field! Every new development opens a new field for compressor sales and profits!
- ★ LAYOUT DEPARTMENT—Helps you and your customers by making layouts for food store modernization programs. An inestimably valuable service at no additional cost.
- ★ ADVERTISING—Sherer Cases and Coolers regularly advertised to your customers by direct mail and thru the leading food trade publications. Each ad stresses your ability to offer the retail food trade Sherer Cases and Coolers.

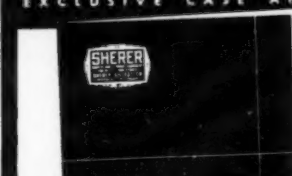
Addition of the Sherer Case and Cooler Franchise to your present line is your move for '37. Mail coupon so that we may send full details. Be sure to tell us which territory interests you.

SHERER CASES AND COOLERS WILL BE

SHERER-GILLETT COMPANY

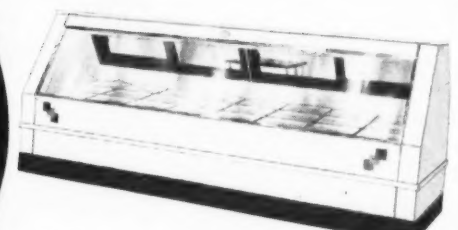
MARSHALL, MICHIGAN

EXCLUSIVE CASE AND COOLER MANUFACTURERS SERVING FOOD RETAILERS SINCE 1892

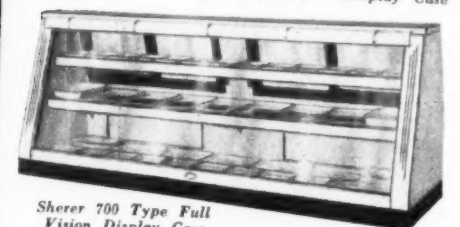


Send us full details about the SHERER Case and Cooler Franchise, including catalog illustrating the SHERER Line.
Name.....
Address.....
Territory Interested In.....

MAIL THIS COUPON FOR CATALOG AND COMPLETE INFORMATION



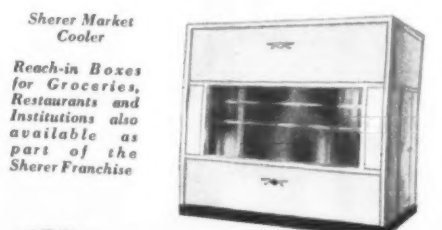
Sherer CI500 Type Refrigerator Display Case



Sherer 700 Type Full Vision Display Case



Sherer Fruit and Vegetable Display Case with Storage Base



Sherer Market Cooler

Reach-in Boxes for Groceries, Restaurants and Institutions also available as part of the Sherer Franchise



AIR CONDITIONING AND REFRIGERATION NEWS

Established 1926, Registered U. S. Patent Office as Electric Refrigeration News.

Published Every Wednesday by
BUSINESS NEWS PUBLISHING CO.
5229 Cass Ave., Detroit, Mich.
Telephone Columbia 4242.
Cable Address: Cockrell-Detroit

Subscription Rates

U. S. and Possessions, Canada, and all countries in the Pan-American Postal Union: \$3.00 per year; 2 years for \$5.00. All other Countries: \$5.00 per year. These rates will be increased on March 1, 1937. Notice: Please do not pay money to strangers claiming to represent this paper. We employ no subscription solicitors. Send orders and remittances by mail.

F. M. COCKRELL, Publisher

GEORGE F. TAUBENECK, Editor
PHIL B. REDEKER, Managing Editor
THEODORE T. QUINN, Assistant Editor
WINIFRED HUGHES, Assistant Editor
K. M. NEWCOM and F. O. JORDAN, Contributing Editors

R. T. CARRITHERS, Advertising Mgr.
HELEN K. GILMORE, Asst. Adv. Mgr.

JOHN R. ADAMS, Business Manager
ROBERT P. NIXON, Asst. Business Mgr.
JEAN H. ADAMS, Subscription Manager
LOLA E. DEW, Circulation Manager
WINIFRED MERSON, Spec. Representative

New York Representative
JOHN B. GALLAGHER CO., INC.,
11 W. 42nd St., New York, N. Y.

Member, Audit Bureau of Circulations
Member, Associated Business Papers

VOL. 19, No. 15, SERIAL NO. 403
DECEMBER 9, 1936

Copyright, 1936, Business News Pub. Co.

Six Million New Homes

IF today's needs for new housing are to be met, the National Association of Manufacturers' Committee on Housing and Employment points out, nearly 6,000,000 new home units must be built.

What this presages for the air-conditioning and refrigeration industries is self-apparent. While some manufacturers of these products have enjoyed increased business, others have not been satisfied with the returns expected from the building construction reported to be under way. The latter group may be heartened by this prediction.

Construction, although 75% better for the first 10 months of this year than for the similar period of 1935, is still a laggard in comparison with production generally.

Taking 1929 as a base, industrial production for the first 10 months of this year averaged 68.1% of the boom year totals, while new building trailed at only 48.8%.

Consequently the Committee on Housing and Employment has decided to urge upon the Congress of American Industry, when it meets this week (Dec. 9), the appointment of a committee of industrialists to aid and encourage building of low cost homes for wage earners, pointing out especially the need for moderate rental units costing between \$2,000 and \$3,000.

Distinguished Help

The prospect of enlisting such distinguished help, even if indirectly, in the selling of close to 6,000,000 refrigerators, plus an equal amount of air-conditioning installations, should set every manufacturer thinking. The rapid spread of rural electrification by both the government projects and power companies should make even the more remotely situated new dwellings prospective customers for these two industries.

That low-cost homes can be air conditioned economically and satisfactorily has been demonstrated by experiments performed at Mason City, Wash., by governmental research workers at the Grand Coulee Dam project (AIR CONDITIONING AND REFRIGERATION NEWS, July 15 and 29, 1936). It is clearly up to the manufacturers

to acquaint the public with these facts, and to educate its distributing organizations up to the opportunity, if results are to be obtained from this coming rise in building construction.

Employment Booster

Another angle of this prospective new construction cannot be overlooked—that is the rise in employment it will bring, and the subsequent enlarging of the market for refrigeration and air conditioning through increased purchasing power.

Saul Cohn, chairman of the housing committee of the National Retail Dry Goods Association, adds this fuel to the fire:

"There are approximately 28 million buildings divided almost equally between farm and urban dwellings. Based upon a 100-year life, 1%, or 280,000, become obsolete annually. There are 500,000 families created every year. There are three and a quarter million homes unfit for habitation. There is a pent up demand due to the low ebb of construction during the last six years. From a peak of three billion dollars of residential construction, we were off nearly 91% during the depth of the depression."

Big Market after 1940

Before the Fifth Annual Merchandising Clinic of the General Electric Co., held at Nela Park last week, Channing E. Sweitzer, managing director of the National Retail Dry Goods Association, said in part:

"With the advent of economic recovery, with the restoration of public confidence, with the mounting number of marriages, with the undoubling of families, and with the increase in population, which is expected to reach 133 million in 1940, it has been conservatively estimated that we shall need the erection of 750,000 homes annually over a period of years in order to meet the housing shortage which was created during the period of the depression.

"I am making brief reference to our national housing problem—which of itself might well be the subject of a session of this conference—because it would be difficult to conceive of any widespread building program which failed to stimulate consumer demand for major electrical appliances. It is difficult to imagine today the erection of even a low cost housing unit in our smallest towns and villages which is not equipped with electric current—making the occupants thereof potential users of the many electrical appliances which are more and more becoming to be regarded as necessities in the households of the nation."

Present Estimates Modest

An obvious conclusion to be drawn is that no estimate of the future market for refrigeration and air conditioning should be based on present saturation estimates. The number of wired homes seems due for a precipitous rise.

The National Association of Manufacturers declares that there is an immediate need for 6,000,000 new homes. Presumably this construction should take place within the next few years. The managing director of the National Retail Dry Goods Association has statistics and data which lead him to believe that after 1940, the nation should erect 750,000 new homes annually.

Even if the industry were to approach saturation of the present market—and it is a long way from that—it would appear from the foregoing that the refrigeration and air-conditioning business may be considerably better during the next decade or so than anyone has yet ventured to predict.

Letters

A Fair-Minded User Puzzles on a Problem

Pilot Point, Texas
Nov. 26, 1936.

Editor:

This inquiry has been advised by an outstanding refrigerator company, giving your name as the real authority to inform me. Just what are the standards demanded of the box itself regardless of the sealed-in mechanism?

In selecting a cabinet I noted the variety of locks—the fact that some freezing units have little doors and others do not brings up a question, and there are doors and doors to watch. But the cabinet I am now using absolutely leaks cold air at the lower opening corner of the door—the door closed shows an eighth of an inch wider black insulation line at the bottom than the top.

The question is—have I a right to ask for an exchange of cabinets because of this. Two mighty big companies vow I should, but a refrigerator traveling salesman instructed a person here abouts that practically every make passes such conditions by unnoticed, and without considering any exchange, but I'm wondering if there is a mistaken informer? Please tell me.

Both General Motors, and another concern advise me to write you as I have. Thank you for stating the standardization and if possible mail me something printed which I may use in discussing this condition with my dealer if I am absolutely justified in taking it up with him.

(MISS) JESSIE A. JOHNSON.

P.S. Please know that no right-minded woman desires to go blundering into a state of affairs which will make merchants spot her for a nag, and grouch.

Answer: We can't pass judgment on this matter from your description of the situation, but offer this suggestion: ask the dealer who criticized your cabinet to write us and tell us what's wrong with it. Then ask the dealer from whom you purchased the cabinet to write us, giving his side of the story.

If after we get this information it appears that you are entitled to an adjustment we will notify the manufacturer of the refrigerator.

It Seems Lots of Companies Make Tiny Refrigerators

Westinghouse Electric & Mfg. Co.
200 East Fifth St., Mansfield, Ohio.

Editor:

We have found in the AIR CONDITIONING AND REFRIGERATION NEWS publication, dated November 18, under No. 2968 (Hotel Chain, New York), a request for a small refrigerator having approximately a 1½ cu. ft. capacity, about 48 inches tall and 16 inches square.

We have ready for distribution a small refrigerator approximately these dimensions which we have contemplated using for a small 20-lb. ice maker. We find that it would be very easy for us to use a small evaporator in this cabinet and offer it to this hotel chain for just the application which they are making inquiry for.

Would you kindly write us giving us the name of the hotel chain who is requesting this information so we may contact them and offer them the new cabinet which we have designed.

B. C. DAVISON,
Commercial Refrigeration Sales.

Commercial Refrigeration Co., Inc.
55 South Avenue
Rochester, N. Y.

Editor:

In the Nov. 18th issue of REFRIGERATION NEWS under the Question Column, there is an inquiry No. 2968 from a hotel chain who are interested in securing a small refrigerator of two cubic foot capacity.

We wish to advise that we are manufacturing an electric box suitable for the purposes mentioned which is 16 inches square and 34 inches tall, including the refrigerating unit.

If you would kindly give us the name of the prospect for these boxes, or else refer us direct to them, we would appreciate it very much.

M. R. KARGE,
President

Interstate Refrigerator Corp.
96 Fifth Ave., New York City

Editor:

We note in your copy of Nov. 18th REFRIGERATION NEWS, on page 19, you have a request No. 2968 from a hotel chain in New York, who is interested in a 1½ cu. ft. capacity refrigerator, measuring 84 inches tall and 16 inches square.

We would very much like to get in touch with this concern as we

Survey of Manufacturers Being Made for the 1937 Directory

DETROIT—Plans have been completed by Business News Publishing Co. for a survey of all manufacturers of refrigeration and air-conditioning equipment and suppliers of service to the industry in order to make a complete revision of the REFRIGERATION AND AIR CONDITIONING DIRECTORY. The 1937 edition of this book is scheduled for publication May 1.

The John B. Gallagher Co. of New York and Chicago has been delegated to collect the data. Representatives of this company will make personal calls on all companies known to be manufacturing equipment, parts, materials, supplies, tools, etc., for the refrigeration and air-conditioning fields.

This survey has been undertaken in order to secure more detailed information regarding each company than has been published in previous editions of the DIRECTORY. The data will supplement that secured from questionnaires which were sent out by mail as a preliminary to the survey.

The 1937 DIRECTORY will contain the names of all manufacturers and suppliers with listings four different ways: (1) alphabetically, (2) geographically, (3) by trade names, and (4) according to classification of products.

The DIRECTORY will be 6¼ by 8¾ inches and will be Vol. 7 of The Refrigeration Library. The DIRECTORY should not be confused with the 1937 Master Catalog of air-conditioning and refrigeration equipment, parts, materials, supplies, and tools (to be known as "The Red Book"), which was announced in last week's issue and which is described on the back page of this issue.

think we have something of interest, in a small refrigerator about the size they request.

ALBERT MANN,

Laird Engineering Co.
2 Virginia St., E., Charleston, W. Va.
Editor:

We noticed in the Nov. 18 issue of REFRIGERATION NEWS an inquiry, No. 2986, from a hotel chain in New York for a small refrigerator of approximately 1½ cubic feet capacity.

We would like to have the name of this company as we think we have something that may interest them within a short time. Several years ago we developed a unit for a refrigerator of this capacity.

J. M. LAIRD.

Robt. C. Kaiser
386 West Fifth Avenue
Columbus, Ohio

Editor:

Reference to your Question No. 2968 of the Nov. 18 News as to manufacture of small refrigerator kindly advise as to hotel company requiring same.

We are manufacturing a small unit for optical use and same can be used for there requirement.

One of the back issues also made inquiry as to manufacture of milk coolers we have made up these and can furnish same to specification or standard 2 to 10 can capacity, inquiry made by an Ohio dealer.

ROBT. C. KAISER.

He Wants a One-Cu. Ft. Refrigerator or Unit

Cardinal Technical Products
St. Anthony Station
Minneapolis, Minn.

Editor:

We are looking for a very small refrigerating unit or a complete refrigerator of one cubic foot capacity. Should somebody manufacture a complete unit of this size with a compartment door on side or top which can be sold at a list price of \$50, we should like very much to get in touch with the manufacturer. Should anyone manufacture an inexpensive small unit, we could have the boxes made.

A. GARRY.

Answer: See letters above.

They No Longer Pass the Buck

Miller-Schein Co.
Electrical Appliances
440 Main St.,
Stevens Point, Wis.

Publisher:

For several months we have not been getting REFRIGERATION NEWS, and for several months we spoke about it,

The Master Catalog or "Red Book" will be 8½ by 11 inches and will be distributed free to 50,000 companies and individuals throughout the entire industry. It will contain the advertisements of manufacturers whose products are available for national distribution and only such advertisers will be listed in the book. While the book will be distributed free to qualified buyers, it will contain no free listings of manufacturers.

The DIRECTORY differs from the Catalog in that no charge will be made for the listings since all companies, large and small, will be included. The DIRECTORY will sell for \$3.00 per copy and its circulation will therefore be limited to those who are willing to pay that price for the complete information which it furnishes regarding suppliers.

These two publications, the DIRECTORY and the Catalog, will exemplify two distinct types of publishing practice. The DIRECTORY represents "paid circulation" while the Catalog represents free or "controlled circulation."

The DIRECTORY will be edited from the viewpoint of the subscriber. It will contain information regarding all suppliers without regard to advertising considerations.

By contrast, the Catalog or "Red Book" will be edited from the viewpoint of the advertiser. It has been designed so as to be highly attractive as an advertising medium and will have a very large circulation, in fact a complete coverage of the entire industry. A total of 50,000 copies of the Red Book will be published and distributed free on March 1.

and several times my partner and I agreed that we simply had to renew our subscription, and several times have passed the buck to each other.

But just like everything else must come to an end, the passing of the buck to each other has at last come to an end, and we are inclosing our three dollars, and wish you will immediately return us to your good graces, and start mailing us your valuable magazine.

We tried getting along without it, but it's no use, the information contained in your valuable periodical is of inestimable value to our entire organization, and we have come to the conclusion that it is worth many times the price asked for it.

A. W. SCHEIN,
President

Export Data Presented in Foreign Trade Issue

46 Elmwood Ave., Holyoke, Mass.
Nov. 25, 1936.

Editor:

As a reader of the REFRIGERATION NEWS it has been my privilege, through the medium of your interesting weekly articles, to follow you in your travels abroad.

I am at present making an investigation of the domestic electric refrigerator market in foreign countries. In view of this fact I should appreciate any information you might send me in a condensed form of potential markets, extent of market situation, etc. in the foreign countries you visited on your recent world tour.

JOHN G. WALZ.

Answer: The Dec. 2 issue of AIR CONDITIONING AND REFRIGERATION NEWS was designed to answer just such requests as the above.

Here's a Good Prize For a Sales Contest

American Electric Co.
Electrical Wholesalers
116-118 North Fourth St.
St. Joseph, Mo.

Publisher:

In a recent contest among our refrigerator dealers, we offered as one of the prizes a subscription to ELECTRIC REFRIGERATION NEWS.

This prize was won by Mr. Frank Terry, Terry Radio Shop, Atchison, Kansas.

Will you kindly enter a subscription for him to ELECTRIC REFRIGERATION NEWS, for one year, and bill the subscription to our company.

H. BORCHARDT, JR.,
Sales Department

Servel Electrolux Absorption Unit Characteristics & Recent Design Improvements Told by Hainsworth

NEW YORK CITY—Characteristics of the Servel Electrolux absorption refrigeration system for household refrigerators, with a discussion of design improvements that have been made in recent years, were described by W. R. Hainsworth, vice president in charge of engineering of Servel, Inc., last Friday at the final technical session of the annual meeting of the American Society of Refrigerating Engineers at the Hotel Pennsylvania here.

One prime feature of the Servel Electrolux absorption unit, said Mr. Hainsworth, is its valveless control of fluids within a hermetically sealed space.

The refrigerating system used in the Servel Electrolux unit is of the three-fluid type. These fluids are ammonia, water, and hydrogen. They travel in three interrelated circuits to produce continuous refrigeration.

The refrigerant ammonia, traveling in the large circle, is successively a gas, a liquid, mixed with hydrogen and dissolved in water, Mr. Hainsworth explained.

Starting with the generator, the ammonia is expelled from the solution by heat. The ammonia gas travels upwardly to the condenser and the liquid ammonia from the condenser flows by gravity to the evaporator where the gas atmosphere is essentially hydrogen (weak gas).

The liquid evaporates into the hydrogen until the partial pressure of ammonia in the gas mixture is practically equal to the saturation pressure at the evaporator temperature.

The resultant "loaded" mixture (strong gas) which has increased in specific weight due to the presence of the ammonia, carries its load of ammonia by gravity in the ammonia-hydrogen circuit to the absorber where it comes in contact with a solution of ammonia in water (weak solution), the ammonia vapor pressure of which is less than the partial pressure of ammonia in the gas.

Ammonia is absorbed from the gas mixture. By means of a thermo-siphon lift, the strong solution which is formed relays the ammonia load to the generator in the ammonia water circuit. This completes the ammonia loop. The weak gas returns to the evaporator and the weak solution to the absorber to pick up new loads thereby completing the hydrogen and water loops.

The ammonia, hydrogen, and water loops rotate in unison to produce continuous refrigeration. They must, however, rotate at certain speeds with respect to each other to produce best results, as will be later noted from consideration of a working system.

Pressure Constant Throughout

It is characteristic of the system, explained Mr. Hainsworth, that the total pressure is constant throughout, although the ammonia pressure varies with each change in state in the different parts of the system. In effect, hydrogen is used to make up the difference between the high and low sides.

"Since the fluid circulating media require no valves and the pressures are balanced throughout, refrigeration is produced without employing valves or restrictions within the system," declared the speaker.

Mr. Hainsworth explained the operation of the thermosiphon lift, which works on the principle of an air lift wherein a column of liquid balances a much higher column of a liquid and gas mixture.

"In the refrigerating unit the column of solution between the bottom of the absorber and the bottom of the generator more than balances the mixture of ammonia gas and solution in the lift pipe which rises to the top of the generator," he said.

"The solution level in the generator is higher than the overflow point into the absorber with the result that the solution circulates in the ammonia water loop.

"Briefly, the driving force in the ammonia water loop is the thermosiphon lift; in the ammonia hydrogen loop it is essentially the difference in the weights of the weak and strong gases, and in the ammonia gas loop it is the expulsion of gas from solution by heat.

"The component parts of the unit must be carefully located with respect to each other and the pipe sizes and resistances carefully adjusted to produce the correct rate of circulation in each loop.

"The determining factors in establishing the rate of circulation in the ammonia gas loop are the heat input to the generator and capacity desired. In the water loop the maximum rate of circulation is determined from the concentrations of the weak and strong solutions and the capacity desired.

"Many factors control the circulation rate produced by the thermosiphon lift. Some of the most important are reaction head, size of lift pipe, con-

centration of solution and size of the heating chamber. If the circulation rate is excessive there will be an unnecessary amount of heat carried into the absorber with a resultant loss in capacity.

"In the hydrogen loop the circulation should not be any faster than that required to pick up and transport the necessary quantity of ammonia (determined by capacity) from the evaporator to the absorber. The concentration limits which fix the circulation rate are determined by the strong gas partial pressure which is related to the temperatures desired in the evaporator, and the weak gas partial pressure which is a function of the absorber temperature and weak solution concentration.

"The unit cannot be operated at equilibrium with respect to vaporization and absorption of ammonia; therefore, adequate concentration drying heads must be maintained. Knowing the rate of circulation of gases desired, it is then necessary to calculate the force available due to the differences in weights of the strong and weak gas columns. And this, of course, is a function of the weight and concentration. The next step is to design the system so that the driving force will properly overbalance the resistance to gas flow and produce the correct circulation rate. If the circulation is too rapid the gas heat exchanger heat losses will be excessive. If too slow the hydrogen will not transport sufficient ammonia. In either case capacity is effected.

"Finally, in the gas circuit the proportioning of the resistance between the absorber, gas heat exchanger and evaporator is very important, in order to use the pressure drop most effectively for heat transfer purposes."

Mr. Hainsworth next discussed some of the early problems in adapting this system to a domestic refrigerator.

The condenser could not extend above the top of the cabinet for appearance sake, nor could the evaporator be placed too low in the food compartment without lessening cooling efficiency, yet the condensed ammonia must flow by gravity from the condenser to the evaporator.

Thus the space occupied by the condenser near the top of the cabinet could only slightly exceed in height the thickness of the top insulation and cover.

Introduction of Air Cooling

A number of changes and improvements in the refrigeration cycle have been made, said Mr. Hainsworth, a major change being introduced in 1933 when air cooling was substituted for water cooling.

"One of the first problems encountered was to solve the natural draft cooling of the condenser and absorber," he continued.

"After many trials it was found that satisfactory air flow could be obtained by spacing the condenser away from the back of the cabinet and using the chimney effect of the warm air column in this space to draw air through the condenser.

"To take full advantage of this, the absorber cooling surface was located below the condenser, and a volatile fluid in a closed system of pipes was added to transfer heat from the absorber to the cooling surface.

"The efficiency of the air-cooled units was increased by the use of a special analyzer. In the analyzer, heat in the gas from the generator is used to liberate ammonia from the strong solution before it enters the generator."

Before the air-cooling unit was introduced, the evaporator was designed for single temperature operation. This temperature was necessarily fixed by ice freezing requirements.

The food compartment cooling was, therefore, accomplished less efficiently than possible when using an extended surface evaporator at higher temperatures.

"The three-fluid unit," said the speaker, "has the advantage that the evaporator can be divided into two sections operating at different temperatures—one for ice freezing and one for food compartment cooling.

"After the hydrogen is nearly saturated with ammonia in the cube-freezing section of the evaporator, it

is capable of picking up more ammonia under the higher temperature condition prevailing in the box cooling section. To take full advantage of this it is necessary to locate the high temperature section above the low temperature section.

"This introduced the problem of obtaining upward flow, by gravity, of a gas mixture which is becoming increasingly heavy as the ammonia evaporates into it. This was realized by adjusting the gas columns in the circuit outside the evaporator and the gas resistance of the entire circuit to balance the evaporator column and in addition provide sufficient driving head to cause the correct gas circulation between the evaporator and absorber.

"The upper location of the cooling section also provided the opportunity of pre-cooling the warm liquid ammonia from the condenser before introducing it into the freezing section."

The air-cooled condenser necessarily requires a higher space at the back of the cabinet than the water-cooled condenser. In this case parts of the condenser are lower than the top of the evaporator. To transfer the liquid ammonia uphill, a number of units were constructed with the liquid forced upwardly in a column between the condenser and evaporator by using a correspondingly higher generator pressure.

These worked satisfactorily, but a simpler method was worked out by providing two drains from the evaporator. The double drain led to automatic control of cabinet temperatures under various load conditions without using a thermostat.

This was accomplished, said Mr. Hainsworth, by connecting the generator gas outlet to the lower condenser coils which drain to the freezing section of the evaporator. Ammonia which did not condense in the lower section passed to the upper coils of the condenser through a connecting pipe.

Under light load conditions all the ammonia necessary to maintain satisfactory cabinet temperatures condenses in the lower section of the condenser and drains to the lower evaporators section. Since no ammonia passed into the upper section of the condenser, the large surface of the cooling section remained inoperative.

As the load increased and greater condenser surface was required, delivery to the upper section occurred and the upper cooling section of the evaporator became effective.

A problem that came up with the introduction of air-cooling was the necessity of operating with a greater variation in the air temperatures available for cooling as compared to the normal cooling water temperature variation in different parts of the country.

The water-cooled unit, Mr. Hainsworth explained, was charged with sufficient hydrogen at the factory to insure satisfactory condensation of ammonia at the highest cooling water temperature normally encountered in southern territories in the summer. Aside from operating with a substantially equal pressure in all parts of the system, it was characteristic of this unit that the total pressure remained practically constant under varying cooling water temperature conditions. This resulted in the efficiency under winter operating conditions being about the same as for summer conditions.

Due to the wider spread in cooling air temperature, it became desirable to vary the pressure automatically within the system in response to air temperature and load changes, thereby taking advantage of the higher efficiencies corresponding the lower condenser temperatures attainable under normal conditions.

This was accomplished by placing a chamber in the vent line from the condenser to the top of the gas heat exchanger. If the room temperature increases to the degree that the pres-

sure within the unit is insufficient to condense an adequate amount of ammonia vapor in the ammonia condenser, the excess ammonia vapor passes through the vent tube into the hydrogen reservoir and pushes a quantity of reserve hydrogen gas into the absorber and evaporator system.

Pressure within the unit is increased because hydrogen gas is insoluble in water and the ammonia vapor which displaces the hydrogen gas occupies a greater volume than the same amount of ammonia when in the aqua ammonia state.

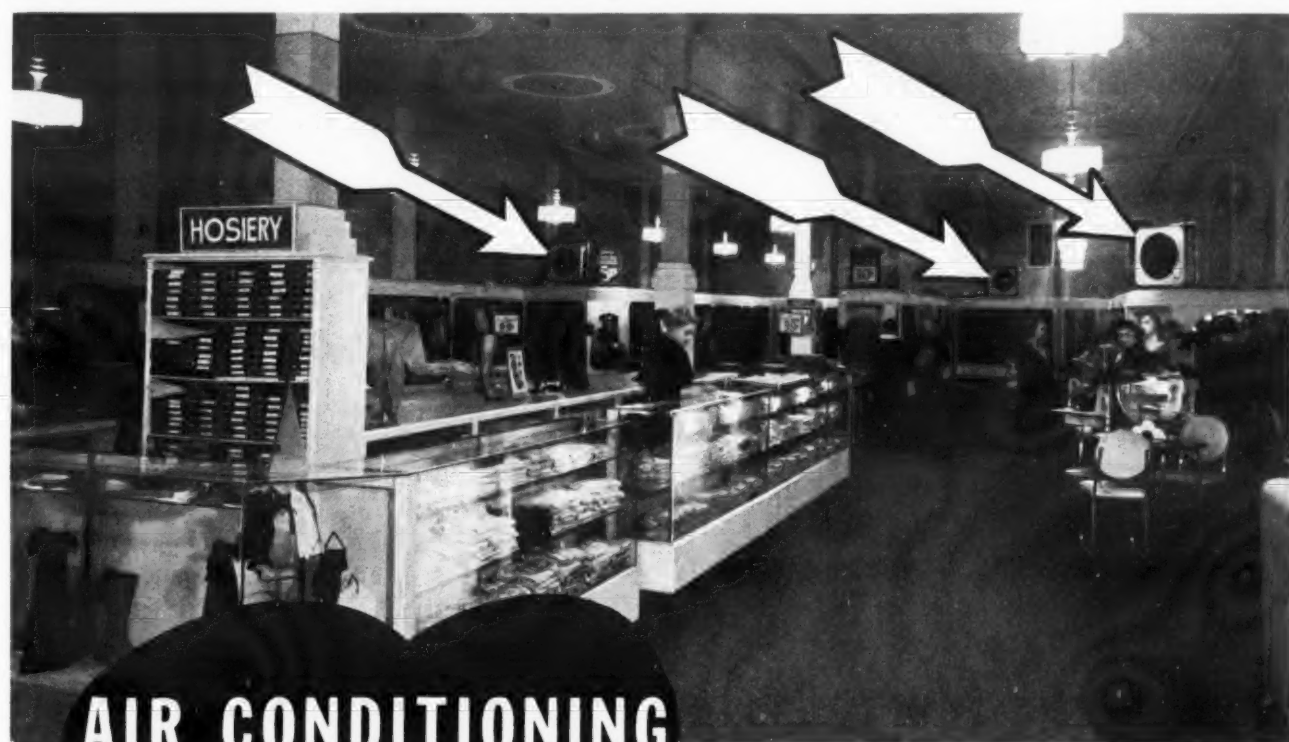
The total pressure is built up in the above manner until an adequate amount of ammonia is liquefied in the ammonia gas in the hydrogen reservoir. When the room temperature becomes lower the ammonia gas in the hydrogen reservoir diffuses into the absorber and is replaced by hydrogen. This lowers the pressure and slightly increases the ammonia concentration of the aqua ammonia.

The reservoir is placed above the evaporator level to permit drainage to the evaporator of any liquid ammonia produced.

In later units, explained Mr. Hainsworth, the idea of storage of one of the fluids under certain conditions automatically to take advantage of easier operating conditions was applied to the ammonia in the system.

By proper arrangement of one end of the reservoir a certain amount of liquid ammonia is trapped in the chamber during a venting or high load period. This in effect removes substantial quantities of ammonia from solution in the generator and absorber and creates a weaker solution capable of satisfactorily absorbing ammonia at high room temperatures.

As the room temperature is lowered the ammonia is returned to the solution by diffusion and convection and the efficiency under normal operating conditions is correspondingly increased.



AIR CONDITIONING
for 1937

tised and merchandised under the well-known Ilg diamond trade mark.

A complete assortment of self-contained units, unit systems, and central systems are available to meet the expanding 1937 market. Ilg Air Conditioning distributors can and will make money during the coming year.

Exclusive distributor's franchises are still available for several territories. Responsible organizations equipped for selling, installing, and servicing air conditioning systems are invited to inquire about this opportunity.



The story of Ilg air conditioning dates back to 1930 when the first Ilg-Kold System was installed in a Minneapolis chain store. It was one of the first unit systems installed by anyone for comfort cooling and air conditioning.

Soon the idea of air conditioning stores, restaurants, and shops began to take hold everywhere, and foresighted business men began to recognize the advantages of Ilg Air Conditioning. Today hundreds of communities are delighted to find their drug stores, restaurants, candy shops, etc., delightfully cooled and air conditioned by modern Ilg-Kold Systems. Even a major depression could not retard the progress of this growing trend.

Looking forward, Ilg Air Conditioning distributors face a 1937 full of promise. As one of the pioneers of the industry, the Ilg line enjoys favorable recognition and is nationally adver-

ILG ELECTRIC VENTILATING COMPANY
2829 NORTH CRAWFORD AVENUE CHICAGO, ILLINOIS

Foreign Trade

American Business Must Export Sales Methods to Successfully Market Abroad, Pratt Says

American manufacturers who want to do a good business abroad must export their merchandising methods as well as their merchandise, Edward Ewing Pratt, sales promotion manager of Chrysler Corp. export division, and former director of the Bureau of Foreign and Domestic Commerce, said in an address to the World Trade Conference on "Promotion of American Business in Foreign Markets."

"The promotion of American products in markets outside of the United States depends on the policies and efforts of two distinct and frequently unsympathetic groups," Mr. Pratt said.

One of these, he said, is the American government; the other is the private company interested in extending its business.

"There was a time," Mr. Pratt said, "when both of these activities appeared to be fairly simple and straightforward; but that time has passed. The entire foreign trade situation has become complicated and confused."

Factors Tending to Alter Character of Foreign Trade

Summarizing factors which are altering the character of our foreign trades, the speaker noted the following:

Unstable currencies. "We may have derived some passing benefit from the devaluation of the dollar, but the general derangement of international exchange, the added impetus toward inflation, the unsettling of confidence in the integrity of our currency and of our national pledges of indebtedness, may, in the long run, do more harm than good. Today there is literally no national currency in which one can place his confidence."

Artificial barriers. "On every hand we find artificial barriers erected by nations to direct, control or restrain the free exchange of commodities. We have long been familiar with tariffs, but tariffs are weak vessels of trade restriction compared with quotas, exchange controls and embargoes."

Lowered business morals. "Perhaps we shouldn't say it aloud but the fact remains that business morals are definitely on a lower plane than a quarter of a century ago. Where are those fine old houses whose names created the prime paper of international finance? The high standards of business honor in foreign trade are, in general, a matter of history. Today both the seller and buyer must 'beware.'"

Unsettled political conditions. "The last 25 years have given us scarcely any respite from wars and rumors of war, aggression and conquest, and similarly warlike gestures. Normal trade cannot thrive under such conditions, no matter how profitable may be the supplying of belligerents with munitions and near-munitions of war. Until we can enjoy a period of peaceful international relations, we cannot expect international trade to resume its normal growth and solid expansion."

Menaces of Nationalism and Low-Cost Producing Nations

"Increasing nationalism. "Hand in hand with the unsettled international conditions and, in many respects, as an outgrowth of the terms of Versailles, has come an increasing sense of nationalism. It has characterized almost every nation and even the dominions of the British Empire."

"It has tended to make each country feel that it should be economically independent. It has been responsible for heightened tariff barriers. It has developed hostility between commercial friends. And it has loudly insisted upon the development of unsound industrial enterprises which have turned the energies of many peoples into wasteful and unsound enterprises."

Menace of low-cost producing countries. "This country has never been without what we thought was the menace of low-cost producing countries. But recently that menace has taken on a more virulent form. In the Far East we find a country not only that has low wages but low labor costs; a country that is backed by an aggressive governmental policy in support of trade extension."

"We cannot help but admire our polite and plucky friends to the west of us; but we should not underrate the competitive menace which they represent in practically every market of the world and in a wide variety of products."

"This is a menace which cannot fail to grow as the unsurpassed resources of the Far East come more and more under the control of a single highly centralized force."

Restriction and control of staple exports. "Another factor that has kept international trade in an uproar of uncertainty has been the increasing control exercised by political authorities over staple raw materials. To those of us who believe in letting trade take its natural course,—and

what true foreign trader can really think otherwise,—this control has not only upset the world's markets and rendered unpredictable essential development of supply and demand, but has greatly reduced production and consumption and has decreased the possible volume of international business."

We have yet, said Mr. Pratt, to see a fully complete and at the same time successful experiment in governmental control of trade in any staple commodity. National experiments in the control of coffee, sisal, rubber, wheat, nitrate of soda, cotton, have invariably resulted only in disaster of one kind or another,—either in the development of new sources of supply, continued depressed prices, great losses in storage or in money advanced on stored supplies, diversion of demand to substitutes,—natural or synthetic,—or simply reduced demand or bumper crops at the most inopportune times.

"Foreign traders generally believe," he declared, "that what governments are attempting to do with clumsy, so-called economic planning, can be better done by the natural ebb and flow of international commerce. In fact we know that there was far less grief and far less loss to all parties concerned when trade took its natural course and when the merchants of the world absorbed the losses, as well as the gains."

Decline in Standards of Living Causes Concern

Changing levels of purchasing power. "Another upsetting factor in foreign trade has been the shift of markets occasioned by radical changes in purchasing power and standards of living. It must be evident even to the most casual observer that the general standard of living, well-being and comfort in many countries, that were and still are our good markets, is declining to the point where it should give us grave concern."

"Our objective as foreign traders," he said, "should be to build up the standards of living in our customer markets. And I for one am glad to be associated with an industry which is virtually engaged in exporting the American standard of living, where every unit of product exported carries with it a development quota of local business that far exceeds the value of the unit exported from this country."

Passing of the export middleman. "A change which has essentially altered the entire pattern of foreign trade has been the passing of the export middlemen and the development of direct export business. Some of us, who recall the manner of export trade prior to 1914, well remember the export commission houses and the export merchants as the important factors in the situation."

"We recall that there were only a handful of hardy manufacturers engaged in direct export business. A large part of our foreign trade was handled by houses specializing in export business only. Today these export middlemen, with two or three notable exceptions, have passed entirely from the picture and have left the field in possession of manufacturers who are carrying on their own business overseas."

so large a number of that particular model should have been built in the first place, out of a total annual production probably not in excess of 2,500 cars. The manufacturer apparently did not know that he never had had a demand for cars of that type. He did know this simply and solely because he had no method of forecasting the demand for his product."

"He was building what he thought the market would absorb. Advice or counsel as to the market demand would probably have been wasted upon him. He would have brushed aside the elaborate forecasting system of a nearby and rival American plant as unproductive and useless. There is probably not in existence today in any European industrial organization anything that could be called or would pretend to be a scientific method of forecasting demand."

The French Method Of Salesmanship

The Paris office of a large American advertising agency called on sixty Parisian automobile dealers, said Mr. Pratt, citing another instance. In each case the representative,—a native, personable Frenchman,—presented himself as a possible purchaser and requested that the merits of the car be fully explained to him. The results were rather interesting:

(a) Not one of the sixty asked him for his name or address;

(b) Only two of the sixty offered a demonstration;

(c) Not one of the sixty could give a specific reason why a car was any better than any other make.

"The attitude of the 'salesman' encountered in these establishments was 'there's the car, sell it to yourself,'" Mr. Pratt stated.

"An American business man a year or so ago took up his residence in Europe and during that time he was in the market twice for an office and on more than one occasion for living quarters," the speaker said.

"In the course of his residence he placed his wants before practically every real estate dealer in the prominent European city where he was located, but no real estate man ever followed him up, ever telephoned to find out if he had made a decision, or ever visited him later to see if he had closed a location, ever submitted further properties, or ever evinced the slightest interest in whether the American secured quarters or not."

The Task of Renting or Buying Property in France

"The process of finding a house in Europe is an exceedingly interesting but sometimes exasperating experience," he continued. "First you visit the leading realtor. He meets you across a counter or talks to you through a wicket. It would never occur to him to ask you to be seated or to provide a chair for that purpose."

He then shoves a very legal-looking blank at you, which, if your command of the language is adequate, you find is an agreement,—and a binding one,—to the effect that if you rent one of the places indicated you agree to

pay the agent his commission which is mentioned. And let me pause to say that in Europe it is the buyer or the tenant who always pays the commission and not the seller or lessor."

"After you have signed the agreement you receive the coveted list of houses, usually consisting of three addresses, not more than five, and sometimes only one. After each is indicated the day of the week and the time at which the house will be shown,—for example, on Tuesday and Fridays, between two and four. You might think you were attending an embassy reception."

"And let me tell you," Mr. Pratt said, "if you arrive at 4:15 you will be told, and none too politely, that it is too late to show the premises, and the door will close emphatically. And if by any rash chance you should visit a possible home bearing the sign 'a louer' on Sunday, the houseowner will gaze at you in mingled scorn, anger and contempt. 'Mais non, c'est dimanche!' He simply must spend the afternoon in the cafe."

The realtor or agent would never think of accompanying you to visit the house he has for rent, the speaker continued. It would simply never occur to him. Newspaper advertisements as a method of renting are used by no means as generally as here. The maximum sales effort,—in case of a sale of property,—is a notice posted on the front of the building, and another similar notice in the notary's office or on a bulletin board in front of the notary's office. Occasionally a few notices are posted on nearby billboards.

Service Work Seems Up To the Householder

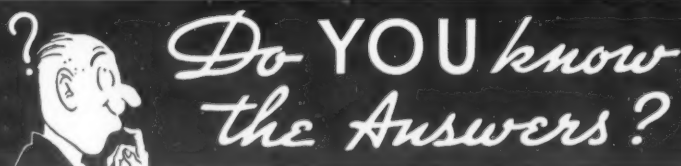
"A gentleman residing near Paris took possession of a new house in which were installed a central heating plant, manufactured by a French concern, and an electrical refrigerator manufactured by an American concern. His experience with these two companies is interesting and enlightening," said Mr. Pratt.

"At the end of the first two weeks the French central heating plant was completely out of commission and refused to function. The householder telephoned the company, but without results; he then wrote two or three sharp, definite, explicit letters, still nothing happened; he placed the matter in the hands of his attorney, who threatened suit."

"At length a repair man appeared, but he was apparently unfamiliar with the heating plant, his efforts failed to accomplish anything. Finally the owner, in despair, and in real need of heat, employed engineers who were finally able to coax a fair degree of performance out of the temperamental French heating plant."

Contrast this procedure with that in the case of the American refrigerator. In the first place, the apparatus worked perfectly from the first minute. At the end of three weeks, however, a young man appeared from the refrigerator company. "How is the refrigerator operating?" "Perfectly." "But I'd like to examine it and see if it's O.K." Which he did. A slight adjustment.

(Continued on Page 17, Column 1)



Count 20 points each for the correct answers to the following questions. Can you score 80? Don't look now, but the answers are on page 27.

- Of the following football teams only one ever played in a "Tournament of Roses" game:
Carnegie Tech Minnesota
Michigan New York University
Princeton Texas Christian
- The historic cup for which professional hockey teams compete is called:
The Walker Cup The Davis Cup
The Stanley Cup The Standish Cup
The Ryder Cup
- Of course, everybody knows that the oldest city in the U. S. is:
New York City Providence, Rhode Island
Philadelphia, Pa. St. Augustine, Florida
- Although the Panama Canal belongs to the U. S., its construction was begun by:
England Mexico
Spain France Germany
- What brand of automotive tubing can be heat-treated without injury?

The Answer to Your Tubing Problem is
BUNDY TUBING
BUNDY TUBING CO. . . DETROIT

Merchandising Technique Gives Americans Advantage

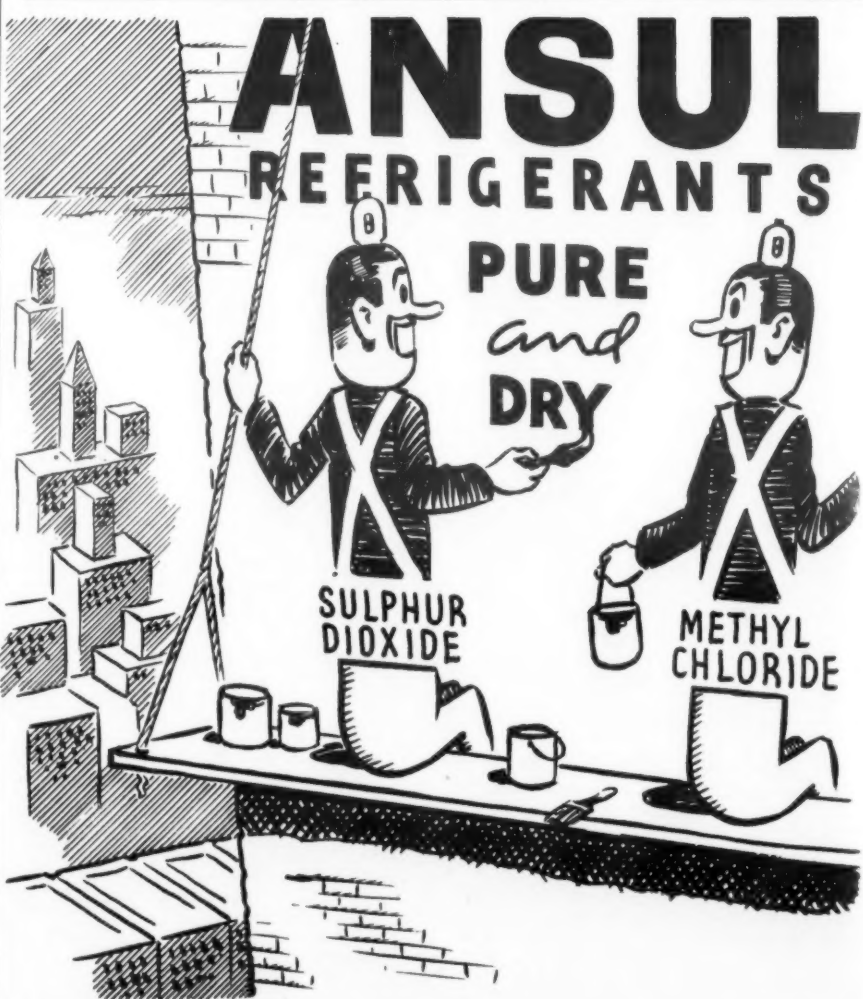
Widening breach in merchandising methods. "When the foreign trade of the world centered in London and we were a mere outpost, our methods, if they were different, didn't matter very much. As a matter of fact they probably weren't very different. But since we have taken the center of the stage our merchandising methods have been increasingly different from those of other nations."

"We have developed the selling aspects of our business far beyond any other country. We have developed what is literally a science on the art of sales which other countries fail to understand,—fail even to recognize. This development has tended to set American business off by itself and to widen the breach between business here and business abroad."

Mr. Pratt cited the story of a prominent European automobile manufacturing concern which not so long ago found themselves with an excess of 200 cars of a model that was fast becoming obsolete. An American manufacturer would probably have moved those cars at any price and moved them quickly, he declared. Not so the European.

He figured the cost of the cars, the overhead, and more important than anything else, his profit. The sum of these items was his price. He would take nothing less. The cars stayed in the warehouse, becoming each day more obsolete,—less salable. His working capital was tied up; production of new models was delayed; interest was lost; yet he would not reduce the price. Those cars stayed in storage for more than six months.

"The interesting point of this," he said, "is not only that the cars were permitted to stay in storage with no real effort to move them, but that



ANSUL CHEMICAL COMPANY
MARINETTE » » » » WISCONSIN

The Role of Government in Promoting Exports & Foreign Trade

(Continued from Page 16, Column 5)

ment, a bit of oil at some crucial point and he was off with a courteous 'Au revoir.'

"Three weeks later appeared a capable woman who introduced herself as an expert on refrigeration of household foods, from the American electrical refrigerator company. She had come to assist Mrs. Householder with her icebox problems, and give suggestions and instructions, if necessary or desired.

"Her visit of two or three hours was helpful, not only to the mistress of the house but to the servants as well. Her visit was highly appreciated. Four weeks went by and who should appear but the young engineer. 'Is the refrigerator still working all right?' It was. Well, he'd like to see it. Again, some slight adjustment, a bit of oil and the courteous farewell."

This experience, declared Mr. Pratt, fairly typifies the spirit of American business as contrasted with the spirit of business in many foreign countries. And it should not be interpreted to mean that our foreign friends are any less courteous or less friendly in their business relations than we are. Perhaps they are even more so. But they do not recognize what we believe to be the essential importance of selling, of developing business, and of servicing that business after it has been developed.

Governmental Processes Which Restrict Foreign Trade

"The activities of our national government have become so many, so insidious, so paternalistic, that they can easily make or break our foreign trade," Mr. Pratt told his audience.

"These activities may be divided into two varieties, those which are the result of major policies on the part of the government and may or may not be directly aimed at foreign trade; and those which are designed to aid and foster foreign trade,—or the contrary, if that be the aim of the government, and it unfortunately seems to be the case in many governments."

Among the policies of our government which restrict foreign trade he listed:

- (1) Restriction of production, which means restriction of exports of raw materials;
- (2) Maintenance of artificial price levels on raw materials;
- (3) Increased costs due to increased taxes, increased labor costs (not wages), increased costs of transportation, increased costs of power and the like;
- (4) Restriction of our merchant marine through enforcement of impossible conditions of operation;
- (5) Maintenance of a stable unit of currency, or conversely the devaluation of the currency; as well as measures taken by our government to support such policies;
- (6) A high or low tariff policy; a protective tariff policy or one chiefly for revenue.

Steps towards Remedying Of These Conditions

"As to the effects of these governmental policies the foreign trader should look to the government for amelioration, support and assistance. It should be an obligation of our government to overcome these barriers, or at least to lower them, to reduce their adverse consequences, and as far as they are the result of policies of other governments to negotiate for their reduction to the advantage of our nationals," Mr. Pratt maintained.

"We are indeed fortunate in having as a member of our government a man who apparently believes that this is the function of government and who has proceeded to put his belief into practice," he continued.

"Single-handed, against opposition both within and without the administration, he has driven relentlessly toward his objective. I refer to our Secretary of State, Cordell Hull, who has done our foreign trade an unforgettable service, and who has originated and developed a new and distinctive foreign policy which is and will continue to be of inestimable service to every branch of our international trade."

Work of the Bureau of Foreign & Domestic Commerce

We are also intensely interested in what our national government is doing or should be doing to promote the sales of American merchandise in foreign markets. For many years exporters have looked to the Bureau of Foreign and Domestic Commerce for information and guidance, said the speaker.

This is particularly true of the smaller manufacturers who haven't the necessary facilities for collecting the information for themselves under

the wise and sympathetic supervision of our eminent Secretary of Commerce,—the service of the Bureau has continued its useful, in fact, indispensable career.

"We expect our government to maintain a technically qualified staff," he said, "equipped by training and experience, to spend the rather sizable appropriation entrusted to the Bureau of Foreign and Domestic Commerce for the purpose of encouraging and stimulating foreign trade."

"We look to our government to see that this agency is kept free from attachments to any idea, political party or individual. We look to our government to see that there emanate from the Bureau of Foreign and Domestic Commerce unbiased informative, technical data which will not only help and aid the inexperienced but will serve as a guide to the experienced as well."

Government Services to Promote Foreign Trade

"More concretely we have a right to ask our government to perform certain services which will assist and promote our overseas business," Mr. Pratt said. "The most important of which at this time I believe to be, and commend to our Secretary's attention:

"First, to establish some method by which international trade may be relieved of the uncertainties of fluctuating exchanges. Given a sincere desire to solve this problem for a harassed foreign trade fraternity, it doesn't seem to be an impossible problem, nor need it interfere with our internal monetary structure which may be used as a football for as many play-boy economists as wish to toy it."

"We must never lose sight of the fact that stability of conditions is the life blood of international commerce."

"Second, as a nation we need to have done a job of publicity. We need to have placed before the world the facts about our trade and the reasons underlying our commercial and economic policies. In the best and highest sense of the word the United States needs propaganda in foreign markets."

Needed Extension of Present Government Services

In addition to these two functions of primary importance, Mr. Pratt noted other and almost equally important functions which, although at present being performed, should be extended and rendered of still greater value to both experienced and inexperienced foreign traders. Some of these services that the government should develop and perfect are:

- (a) To furnish accurate, authoritative, timely, and immediate reports on business conditions, uncolored by political purposes;
- (b) To supply intelligent, comprehensive, detailed, timely statistical reports;
- (c) To publish technical information on such subjects as,
 - (1) Sales methods.
 - (2) Commodities.
 - (3) Business procedure and usages.
 - (4) Merchandising.
 - (5) Prices.
 - (6) Terms of sale.
 - (7) Methods of distribution.
 - (8) Advertising.
 - (9) Sales promotional methods.
- (d) To maintain a personal information service in foreign countries staffed by persons familiar with the market, speaking the language of the country.
- (e) To furnish an economic and geographic market analysis service, which the exporter finds peculiarly lacking in our foreign trade literature.
- (f) To maintain at all times a reservoir of technical information on such subjects of foreign trade as,
 - (1) Tariffs.
 - (2) Commercial laws.
 - (3) Finance.
 - (4) Taxes.
 - (5) Transportation.
 - (6) Communications.
 - (7) Documentation.
 - (8) Credits.
 - (9) Insurance.
- (g) To develop and extend the trade opportunity service to such a point that it may be confidently relied upon by those inexperienced in foreign trade and a help to those more experienced.
- (h) To enlarge and develop information closely allied to credits which will enable all exporters to develop more data on credit risks.

"To develop and extend the trade opportunity service to such a point that it may be confidently relied upon by those inexperienced in foreign trade and a help to those more experienced."

"To enlarge and develop information closely allied to credits which will enable all exporters to develop more data on credit risks."

How Can Traders Best Promote American Goods?

"In the midst of this confusion, adapting themselves to changing conditions, and in spite of the trade-discouraging tendencies of governments, it behooves industry and foreign traders generally to get a move on and to go forward under their

own steam," he said. Under the circumstances the primary responsibility for promoting sales in overseas markets is the concern of the foreign traders of the United States. The problem is, therefore, how can we do so most effectively.

"Two premises should be recognized at the outset:

"1. That our selling methods are essentially different than those of other nationalities, that they are further developed, more carefully planned and more aggressive.

"2. That our ability to produce merchandise by standardized mass production methods is an advantage enjoyed by no other nation, and perhaps scarcely understood by any other nation."

Customer Must Be Served In Foreign Markets Also

Promotion of sales in foreign markets, while essentially the same as in domestic markets, emphasizes different phases of the subject, Mr. Pratt stated. Basically the economic motives of all nationalities are just about the same. But social, racial, climatic, economic and industrial differences are sufficient to cause infinite variations in the application of the principles of promotion of sales to various countries and various national groups.

The cornerstone of any realistic program of sales promotion must begin with the customer, because sales promotion deals with the customer rather than the seller. That cornerstone is "the customer must be served," he declared.

"To successfully do business with any people the seller must not only understand and sympathize with them, but he must see things from their point of view," said the speaker. "It is the essence of sales promotion to obtain and to understand the customer's viewpoint. No matter how much our Anglo-Saxon instincts may build up our egotism, we are not

superior to other peoples. But we are different and in order to succeed in foreign trade we must know and understand those differences.

"But let us interpret this principle rationally and in its broader sense as well as in the light of our own economic and industrial situation. Let us interpret it in the light of facts, not fancies. The principle to which I have referred does not say and certainly does not mean that 'every whim of the customer must be catered to.' It certainly does not mean that if the customer wants a cardboard body on his motor car or a steam engine under the hood that we should give it to him."

Native Customs & Preferences Should Be Observed

"There are two ideas involved here which should not be refused:

"(1) There are certain things we must do to meet physical conditions, legal requirements and social customs. For example, we cannot hope to sell motor cars with left-hand drives in countries where left driving is the rule of the road. But—

"(2) Where our methods are better, where they represent a clear advance over methods and merchandise previously used, and where our costs would be raised by making changes in our standard products, then we should not bow to the demands of our customers but should hold unwaveringly to our course which is dictated by our standardized methods of production."

America Can Meet Foreign Trade Competition

We should recognize frankly, he believes, that we are able to meet competition in price,—if and when we are able to meet it,—because we are able to produce quality merchandise by standardized mass production

methods at prices lower than those same articles of like quality can be produced by the cheapest foreign labor.

No better example could be found than the automobile industry, Mr. Pratt feels. One has simply to examine the recent automobile publications of Great Britain and France, describing the automobile shows recently held in London and Paris, to realize that the majority of the cars produced in Europe give no more in performance than our own lowpriced motor cars,—frequently less,—yet at what prices: two, three, four times the cost of cars here. And wages are usually far lower.

"This is a threadbare theme and is only emphasized here as a warning against losing the great advantages of our standardized mass production, which is today the foundation of our export business in our manufactured commodities," he told the merchandising section.

"The basis of all sales promotion overseas is market analysis, not only that which compares one country with another and determines the better markets, but that which endeavors to make a complete and exhaustive analysis of each individual market. Complete market analysis includes not only the general facts about a market but also a review of those facts which directly affect the sale of any particular merchandise."

"To be of value,—and market analysis is far more valuable in foreign than in domestic trade,—market analysis must be something more than a statistical catch-all. It should aim directly at the bull's eye,—the potentialities of the market for our merchandise."

"A sound program of sales promotion and development is not a hodgepodge of publicity stunts, it is not a brilliant idea that attracts public attention for a few moments, it is not a meteor flashing through the heavens

(Concluded on Page 18, Column 1)

ANACONDA COPPER REFRIGERATOR TUBES



Coils are wrapped in moisture-resistant paper which protects the finish of the tubes.

Cutaway view of inside of tube. Note the bright inside surface.

Specially deoxidized . . . thoroughly dehydrated, unusually soft

There are three outstanding reasons why Anaconda Copper Refrigerator Tubes enable you to do a first-class installation job quickly, easily . . . and with the best results for your customers.

1—Deoxidized. Anaconda Copper Refrigerator Tubes are 99.9% pure copper, specially deoxidized to increase their corrosion-resistance.

2—Dehydrated. These high quality tubes are thoroughly dehydrated. They are manufactured according to A. S. T. M. specifications by methods which assure unusually bright, clean inside surfaces.

3—Soft. Then, too, Anaconda Copper Refrigerator Tubes are unusually soft. They may be easily bent and will flare without cracking.

The leading refrigerator manufacturers' specifications for tubes to be used in installation work are met by Anaconda Copper Refrigerator Tubes. When you install them, you give the purchaser full value for his money. The result is increased good-will for yourself and for your business.

Anaconda Copper Refrigerator Tubes are carried in stock by leading distributors of refrigerator parts.



FRENCH SMALL TUBE Branch

THE AMERICAN BRASS COMPANY • General Offices: WATERBURY, CONNECTICUT

Transporting of American Sales Techniques Abroad Is Job for Promotion Men

(Concluded from Page 17, Column 5) of business, not a firecracker, nor a bunch of firecrackers, flags and flubdubs," Mr. Pratt said.

"On the contrary, it is a sound, constructive, brick-by-brick project with a definite goal to which each part makes its contribution according to the predetermined plan.

"The best test of any portion of a sales promotion program is whether, after it is finished, it leaves some permanent contribution to the enhancement and development of sales. A mere passing show is not such a contribution.

"Any program of sales development, and this is particularly true of foreign trade, which is only a series of flashes-in-the-pan, is a wasteful and useless expenditure of effort and of money."

Methods Must Be Adapted To Foreign Conditions

The most important function of sales promotion and development in foreign trade is the adaptation of American sales methods to overseas conditions. There we have a big job, but one from the successful accomplishment of which will flow large results, he averred.

"By American sales methods I mean the entire gamut of sales methods which are used in this country with little thought of their essential Americanism,—such as the training of salesmen, sales conventions, exhibitions, sales contests, records of sales performance, sales and market research, catalogues, publicity, dealer displays, deferred payments, house organs, motion pictures and many others. These methods are little known and seldom used even in the most commercially advanced countries," said the Chrysler man.

"In this country the mainspring, the motivating principle of all business is selling. But such is not the case in foreign countries, and particularly not the case in Europe. There buying is the important part of the business and sales are left, in a fashion, to take care of themselves. Selling is not the fine art outside of the United States that it is here, nor is it regarded as the potent force behind all business.

"Again I say that the exportation of American sales methods is the biggest and most productive occupation of the American foreign trader. With

constantly increasing trade barriers, with steadily rising tariff walls, we may soon find ourselves in the position of exporting trademarks and trade methods rather than merchandise.

"England's great contribution to world trade was undoubtedly her subtle method of financing her invasions of foreign markets. Our contribution,—if and when we make it,—will undoubtedly be the force, variety and effectiveness of our selling methods," Mr. Pratt declared.

Comparison of Foreign & American Advertising

"Hand in hand with American selling methods and as a part of a sales promotion program goes advertising. It is not too much to say that we are a matter of 15 to 20 years ahead of any other country. And our nearest rival,—England,—is probably an equal distance ahead of her nearest rivals.

"An international advertising congress was held not so long ago in Berlin," he continued. "Business men from all over the world were there. They talked glibly about such subjects as advertising, advertising campaigns, tested advertising, media, merchandising, sales promotion and a host of others with which we deal in the every day conduct of our business, but they were only phrases to most of the non-Americans who were there. "To the average business man outside of the United States an advertising campaign means no more than a series of pretty pictures. The thought of a planned, carefully studied campaign, using only expertly tested media, executed with the precision of military maneuvers, has never occurred to them. If it had they wouldn't believe it."

The absence of any real understanding or sympathy with advertising as we know it is well exemplified by the status of advertising agencies in other countries, he went on.

Function of the European Advertising Agency

In the United States advertising agencies are experienced and skilled organizations. Proficient in the technique of advertising, they do the entire advertising job, from the market study, which actually precedes the development of the advertising campaign, right through all of the creative

and production processes, both as to art and copy; they select the proper media, they care for the placing of the advertisements and follow the checking up of results, the payment of the publications and other media; and finally they bill the advertiser.

For this complete and all-around advertising service the American advertiser usually pays 15% of his total advertising charges, said Mr. Pratt.

"But foreign advertising agencies operate on an entirely different basis," he said, contrasting the two systems.

"They buy advertising space wholesale at prices which are unknown to the advertisers and then retail it out at the best prices that they can get. If two advertisers get the same rate it is a mere coincidence.

"The advertising agency abroad gives as little service as it can get away with. No European advertising agency would for a minute think of performing one-tenth of the service given by any first-rate American advertising agency. This is not true of England where conditions more nearly approximate those in the United States.

"But the point is that in the United States we recognize the value of the expert services of an advertising agency and we are prepared to pay for them. In Europe the activities of an advertising agency are considered of small value, the agencies receive no stated commission and the result is that an advertising agency is almost non-existent.

Deciding on Split of Advertising Appropriation

"An advertising appropriation should be developed with due regard to the advertising needs of particular markets. In some markets," Mr. Pratt noted, "advertising is relatively more expensive than in others.

"The question therefore arises as to whether the appropriation should be so divided as to put a larger amount of money into those markets where advertising is more expensive or whether the advertising appropriation should be divided in accordance with the amount of business and the advertising appropriation approached on the basis of the number of units or the volume of business going into any given territory. Perhaps the right course is a middle one, having due regard for the cost of advertising and for the volume of business being done.

"The American exporter needs," he declared, "more than anything else in connection with his foreign advertising, more and better American advertising agencies in foreign markets, agencies that will correctly and accurately adapt American advertising to conditions abroad, that will clothe our domestic advertising in garments that will make it acceptable to our overseas customers, but without foregoing its essential Americanism."

Adapting American Methods To Foreign Production

If international conditions continue as they now are, Mr. Pratt feels, we must face not only the possibility but the certainty of carrying our production overseas. The conclusion that we must produce within the British Empire is already upon us, provided, of course, that we want to retain much of the business that has been ours, he said.

"In the larger sense this also is a matter of sales promotion, because without the possibility of manufacturing within the tariff walls of many markets, sales are going to be very much reduced," he predicted.

"In a narrow sense this is not so much a problem of sales promotion as it is one of management and production. The problem involved is how to adapt our productive tempo to industrial conditions as we find them abroad, how to create producing units within the barriers that have been erected by other nations, which producing units will enable us to retain or duplicate the economies which have been developing here by the use of standardized mass production.

Development of Service an American Contribution

"Nor should we overlook another essentially American contribution to business. I refer to service. No other business nation regards service as so essential to successful business as we do. The Englishman thinks that if his merchandise is honest—and it usually is,—that he has done everything that is expected of him.

"With most nations other than American the product is an orphan when it leaves the factory door, but not so the American manufacturer who follows his products until it dies a natural death and even then accepts the remains in trade against a new edition.

"Service is indeed an Americanism of business," stated the speaker. "It traces the estate of American business from the privateering class to that of a public beneficiary. It is usually completely un-understandable by our competitors abroad.

Possibilities Latent in Webb-Pomerene Act

"American manufacturers pretty generally have overlooked a real opportunity to increase their share of foreign trade. I refer to the Webb-Pomerene Act, and the wide variety of forms of contract and organization permitted under its terms.

"This Act is the complete answer to the small manufacturer who sees his big competitor getting the lucrative overseas trade, or to the poor manufacturer who can't afford to develop export trade, or to the manufacturer whose line is too limited, and to a host of others. Every once in a while a group of these fellows wake up and think they have made a great discovery. But there it is, a law as public as any other statute, that he who runs may see it, just as well as he who sits in a swivel chair."

'Circus Stuff' Works in Foreign Lands, Too

Nor should we, he feels, in the development and promotion of our trade abroad, neglect the use of typical American methods of sales promotion and publicity,—the Barnum and Wild West methods. They intrigue our foreign friends and achieve no end of attention.

"This is well illustrated by the favorable reactions with which our Chrysler 'Hell Drivers' have been received on every continent. This is a cooperative enterprise of the Chrysler Corp. and its foreign distributors," he said.

"The show and demonstration has actually been shown in twenty-three countries, in sixty-nine cities and has been witnessed by more than 3,000,000 people. 25,000,000 would be a conservative estimate of those who have heard of it by mouth, through news columns, motion pictures and advertisements. In Buenos Aires 80,000 people gathered at one time to see this very remarkable exhibition.

"The most impressive aspect of the whole performance, to our foreign friends," Mr. Pratt related, "apparently was the willingness of our 'Hell Drivers' to take any stock model that happened to be found on a show room floor and subject it to these nerve wracking testing trials.

"Foreign audiences were amazed at the confidence that we displayed in a product which came off an assembly line at the rate of two a minute. It is the one thing that even the best informed people brought up in an atmosphere of European manufacturing methods cannot fathom.

"We believe that we are preaching not only the durability of our own products but of American products in general. We hope other American manufacturers will develop similar demonstrations of their products," he said.

"There was a time when the world, and particularly the business world, was pretty firmly wedded to the idea that business begets business, and that the more trade the more the benefits to a larger number of people. Nations with respect to international trade seem to have gone over to the opposite opinion and now appear to believe the restriction of trade and commerce is the way to bring about national well-being.

"The automobile industry is one, because of its outstanding importance, that has borne the brunt of many of the attacks fostered by this new theory that the way to well being is through scarcity, restriction and repression," he told his hearers.

Essential Points Considered In Selling a Car

"Let us leave out of consideration entirely the manufacturing end of the business for the reason that motor cars cannot be manufactured efficiently or economically in comparatively small markets. But rather focus our attention on the effects of motorization from the point where the car or truck emerges from the factory door or from the hold of the vessel. Remember this points," he said:

First, the car must be displayed and sold. For that purpose a new merchantcraft, employing hundreds of thousands of men and women has come into existence. There is hardly a town of any size but boasts its automobile showroom now.

Second, the car has to have a license and pay a tax of some sort for the privilege of operating,—usually a heavy tax, but one cheerfully paid by the eager owners.

Third, the car must be filled with gas and oil, which requires a nationwide organization, frequently backed by manufacturing plants, distributing organization, service stations and the like. And again there is a tax.

Fourth, the motor car demands good roads. A country where the per capita number of motor cars is high is almost sure to be spending millions on road construction, employing thousands and tens of thousands of men in this work.

Fifth, the car must be housed, which brings into existence garages and storage facilities of all kinds, employ-

ing vacant buildings and causing the erection of new ones.

Sixth, once on the road the car meets with usual vicissitudes and must be serviced and repaired. An industry, employing hundreds of thousands of men, has sprung into existence to meet the needs of motorists.

Seventh, the car must be dolled up, it must have tires, trunks, seat covers, spot lights, cushions, heaters, radios and a host of special equipment, which can and is being made in almost every country.

Eighth, nor do the favorable economic results of the operation of the motor car stop with the roads, garages, filling stations, show rooms, repair shops, and the accessory factories. All along the line materials and machinery must be brought into existence, transported and used in building these facilities. There must be road building materials, road building machinery, specialized garage and repair machinery, with literally hundreds of smaller industries and trades sharing in the work.

Ninth, nor should we overlook the financial aspects of the automobile business. Most cars are bought on credit of one kind or another, which has given rise to the creation of thousands of finance companies and has created business for banks.

Tenth, automobile insurance,—theft, fire, liability,—has become an important part of the insurance business.

"As a matter of fact," Mr. Pratt declared, "all merchandise imports might be divided into two grand divisions:

"(a) Business-creating imports, and
"(b) —for lack of a better term,— money-consuming imports.

Imports Create Business For Any Country

"Practically all imports create business in the country into which they are imported. I doubt if anyone here present can name an article, imported on a commercial basis, that doesn't create some business for somebody. But the bottle of fine perfume brought in and sold over the retail counter has created only a profit for the importer, perhaps a small fee to a custom-house broker and a profit to the retailer.

"On the other hand," he reasoned, "consider the imported motor truck chassis. Consider all the business groups and the multitude of employees which must contribute and receive a benefit from this one imported article. "And yet many of our customers' nations overseas, apparently unaware of the advantages of creating business, are restricting imports of these same 'business-creating' imports to the vanishing point.

"We can't get away from the fact, no matter how hard we try, that international trade is at bottom founded upon barter. Nor can we get away from the fact that anything which interferes with the free and unrestricted exchange of commodities interferes with the development of international trade. This doesn't have to imply free trade, but it does imply far freer trade than we enjoy today," said the speaker.

Prejudice Can Only Impede Foreign Trade

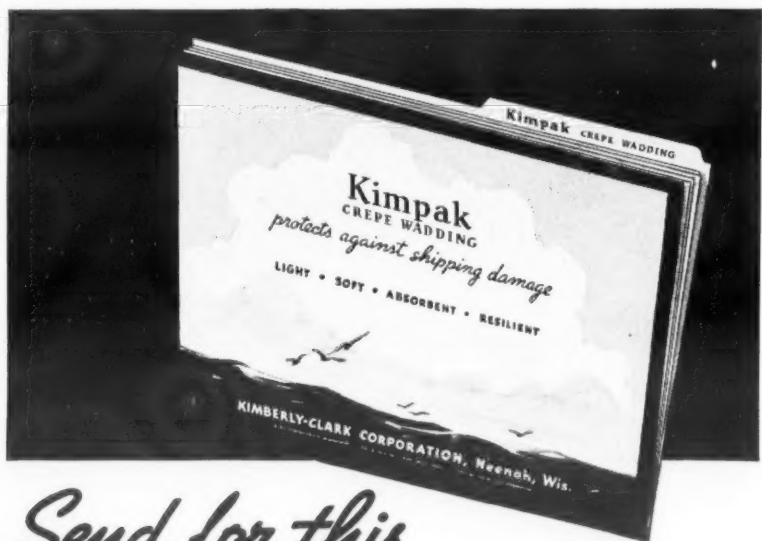
"We must recognize that if overseas markets are to take our merchandise we must take theirs, either directly or indirectly. Prejudice in such matters can only impede our trade and obscure the real issue. For us foreign traders there can be only one yardstick, if we are to increase the volume of trade and the profit therein.

"It is utter folly for us to cry 'Buy American,'" he declared, "and with the same breath urge the development of foreign markets for our agricultural and industrial products. Nor do we want officious officialdom converting very proper quarantine legislation into embargoes to keep out products that have every right to come into this country.

"We in this country have prospered because we have had a large unrestricted market," said Mr. Pratt. "We have not tried to encourage orange growing in Maine, nor potato growing in Florida. We have given the orange growers in Florida and the potato growers in Maine the widest possible market for their products and they have prospered accordingly.

"Let's try and adapt this principle as far as possible in our international relations. And may I venture the hope that we may throw away some of the unsound political creeds that have been weighing us down and look with unafraid eyes and unbiased minds upon the facts, particularly the facts that tell us that with all the best methods of sales promotion in existence and with the best products to back them up we will get nowhere unless we are prepared to buy as well as to sell.

"Against the barriers raised by other nations," he concluded, "we have to offer, as a bargaining asset, the greatest single market in the world; and now we have a national foreign trade policy that is making effective use of that asset."



Send for this
FREE ILLUSTRATED
PORTFOLIO OF
Kimpak
CREPE WADDING

Learn how hundreds of foremost manufacturers use economical KIMPAK to guard products against all kinds of shipping damage

● KIMPAK is a soft, resilient crepe wadding that comes in rolls, sheets, and pads of various thicknesses. It is free of dirt, grit or other foreign substances. KIMPAK protects fine finishes, minimizes breakage during shipment. It gets your product to your customers in perfect condition. Because it is easily applied, KIMPAK saves time, labor and money in packing or package protection.... Send today for your copy of the new "1936 Portfolio." Please make request on your letterhead, and address nearest office.

KIMBERLY-CLARK CORPORATION
NEENAH, WIS.

8 S. Michigan Ave., Chicago 122 E. 42nd St., New York City 510 W. 6th St., Los Angeles



Julius Klein Turns Spotlight On Bugaboos Connected With Foreign Trade

By Julius Klein,* Klein & Saks, New York City
Former Assistant Secretary of Commerce

It is high time that we get down to a few routine realities in our foreign trade thinking. The current partisan hysteria has unfortunately added even further to the bewilderment of our citizenry as to how remote, how detached, how "foreign" this overseas business really is in relation to our national recovery.

Anything which has to do with distant lands too frequently seems to most of our people a matter of sinister mystery, not at all befitting a 100% patriot. Realizing that every one of our foreign wars was begun in defense of our overseas trade interests, your average American is even more convinced that this particular type of business is too risky to be healthy for us as a nation.

If carried on at all, it should be very carefully quarantined from the rest of business so as not to contaminate the latter. And so the export departments of even our best managed corporations are too often sharply segregated, handed over to minor officials, and given scant consideration by the higher executive command.

Now this "out-in-the-dog-house" attitude toward foreign trade is not only short-sighted but simply ridiculous for any sober-minded people who, especially in these flag-waving days, pride themselves on being, to put it mildly, at least one of the leaders of the civilized world, so called.

Even at the risk of differing with some of our supposedly best thinkers and lofty idealists, let us examine a few of these favorite bugaboos with regard to our foreign trade. Just how closely does it fit into our domestic economy? How different is it from our regular internal business as to standards and methods?

Preponderance of Trade Now Is Manufactures

Our export trade is usually disposed of with the casual remark that, after all, it accounts for only 10% of our movable products. Although this is true it does not give a fair picture because, for certain important industries, exporting is an invaluable stabilizer, indeed, an indispensable element without which the industry would probably perish.

At the outset let us remember that farm products are no longer the major portion of our export trade, even though much of the current political hullabaloo centers around that phase of the situation.

Over 70% of all our foreign sales are of wholly or partly manufactured goods, which is exactly the reversal of the situation three decades ago.

In some of our manufacturing industries the percentage of foreign sales is very heavy, 50% for motorcycles, 40% for typewriters, 30% of our motion picture and sewing machine output, 29% of our trucks, etc.

This means that these industries have followed the wise practice of scattering their markets so as to be protected against any sudden sag of buying power among any one group of their customers.

Certainly if this is a prudent policy for a company operating solely within the United States, it can readily be applied on an even broader scale by taking advantage of prosperous areas abroad to further stabilize its position.

A farm implement company manufacturing equipment for some fruit-raising area in this country, let us say, is certainly wise if it seeks out similar markets overseas to carry it along in the event that the domestic customers become embarrassed for any reason.

Such stabilization assures a steadiness of operation for the industry and an increase in volume of output, both of which factors make two valuable contributions to our domestic economy, namely, more jobs for labor and lower prices for the domestic consumer.

Now admittedly foreign trade, like domestic, has its share of genuine problems and difficulties, but there are also many other perplexities which, upon examination, are apt to turn out to be more fancied than real. There are, for example, the fears as to excessive perils of foreign credit risks.

As matter of fact, thanks to the excellent service of credit interchange bureaus and of American bank branches abroad, our credit losses have been kept well below 1% of the amounts involved—certainly a record which compares well with our domestic situation.

There is no more mystery or danger attached to prudent credit operations

in foreign markets than to those within this country. There were, for example, excellent credit risks available to American firms dealing in Mexico throughout the darkest years of its civil war difficulties.

Goods Must Be Sold—Just As in America

Another common delusion regarding export activities is that we are supposed to sell our foreign customers exactly what they want and that American goods are apt to fall far short of such requirements because of their higher cost, and advanced specialization.

Admittedly, our goods are different, but does not much of our selling at home consist of making people want what our ingenious inventors have designed? And that same educational practice can readily and most profitably be adapted to our foreign selling.

Foreign customers are not in a position to express a desire for many lines of American goods because so many of them are specialties the like of which have been quite unknown outside our borders.

Again and again American manufacturers of office appliances, motors, household equipment, and the thousand and one electrical gadgets which make life easier for us here, have gone abroad on widespread crusades of education with very profitable results to themselves and a steady improvement in living standards among our foreign friends.

In this respect as in so many others, good foreign trade practice is not at all "foreign" to the best methods of domestic business.

Herein we touch upon the one of the great advantages which American manufacturers have over their foreign competitors, namely, the experience developed in this country by meeting the diversified and constantly changing demands of this continental home market of ours.

There is no industrial community in the world whose selling is subject to such wide varieties of climatic, industrial and social conditions among its various domestic consumer groups as is the case with American industry.

Our manufacturers know how to sell Argentina, South Africa and Australia the things they need because our factories have long been meeting exactly those same needs right here in our own South West and Middle West.

That kind of trade is not nearly as "foreign" to us as it is to some of our Old World competitors.

Business Has Shifted to Parts In Place of Finished Products

Yet another phase of this point. The size and diversity of our home market has required the setting up of distant assembling plants to overcome transportation costs or local competitive pressure.

This same resourceful adjustability has been applied abroad by many a successful American manufacturer as the postwar nationalistic policies of foreign countries have required the development of new industries.

This has not necessarily meant a loss of our export business, but simply a readjustment of it, a shift from the finished product to non-assembled units and parts, equipment, machinery, etc.

The rise of industrialized areas in countries once given over largely to the so-called extractive raw materials industries should not necessarily be viewed as a direct menace to our manufactured exports.

On the contrary, its resultant increase in foreign earning power has to a considerable extent been responsible for the growing demands in those areas for such American specialties as radios, cigarettes, motorcycles, movies and many others.

Industries whose output have such a seasonal phase have in many cases judiciously and profitably exploited outlets below the equator, thereby stabilizing employment and keeping down domestic prices in many lines, —clothing, rubber footwear, farm machinery, prepared foods, sporting goods, etc.

Far East Is America's Fastest-Growing Market

There is still another impression with regard to our foreign trade which seems to require correction. If you mention it casually to the man in the street he is apt to think of it primarily in terms of European or perhaps Latin American commerce, since so much publicity centers upon

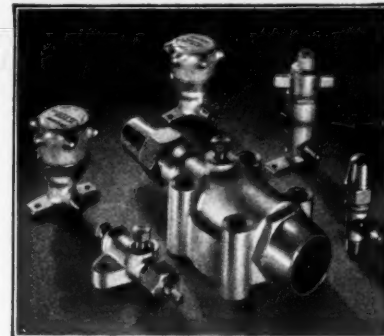
PERFECTION

REFRIGERATION PARTS

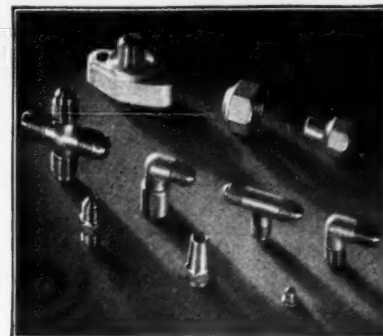
Are Easy To Install Because They Are Uniformly Accurate



COMPRESSOR PARTS



VALVES



FITTINGS

Service Engineers save a lot of time and effort when they use Perfection Certified Parts. These quality products are accurately made to rigid standards and, therefore, are not only easy to install, but fit perfectly and contribute to long, quiet, dependable operation of refrigerating system.

For example, take Perfection Flapper Valves. These parts are made of special imported Swedish steel. They are uniformly flat and free from burrs—and are lapped to a very bright finish. Lapping under factory methods is a contributing factor in making these valves easy to fit and assures a gas tight seal.

As another example, take Perfection Float Valve Needles and Seats. These are made of stainless steel, and are ground at the factory so that they are absolutely concentric and ready for installation. These seats are soft and the needles hard to insure a perfect seat, and assure long, dependable service.

Equal care is taken in the selection of materials, and the same rigid accuracy is maintained throughout all stages of manufacturing of all Perfection products. This complete line includes VALVES, FITTINGS, TOOLS, and COMPRESSOR PARTS.

Leading jobbers everywhere handle Perfection products—and it pays to look for the Perfection emblem when purchasing refrigeration parts.

This was almost precisely the same as our share in the trade in those markets during the years 1924-27 when there was no such "tariff antagonism."

Incidentally it might be well to remind some of our European critics in this connection that our largest "European" imports really do not come from Europe but from the colonies and they are in the shape of raw materials which are almost all free of duty.

And those that do not come from her colonies are shipped to us from her best customers in Latin America and the Far East which are thereby enabled to buy more from the Old World.

There can be no doubt whatever that the tariff issue has been much overplayed either as an aid or a hindrance to our foreign business.

Although it is far too early to judge any results from the Hull Reciprocal Trade Agreements one wonders just how much they are likely to accomplish for our exports, particularly in view of the fact that they seem to be aimed at only one of many major obstacles to our overseas trade and not the most serious one at that.

Remember that they are confined almost entirely to tariff changes which happen to be almost our only trade control, so that when we give up that trump card, as we do in the agreements—we have no other with which to sit in the game with our foreign friends to swap for relief from their many other trade entanglements,—license fees, quotas, and above all the exchange controls, such as are seriously embarrassing our traders in more than 25 countries.

Many Factors Besides Tariff Affect Foreign Trade

Few of these formidable obstacles lie within the scope of the trade agreements. The latter seem to be definitely and unmistakably focused upon just one job, namely, the reduction of our tariffs.

In this they have already affected some 240 commodities with many more in prospect—a far reaching, basic, free trade reconstruction of our whole tariff policy of a sort which no nation has dared to contemplate in these days of grave uncertainty in international matters, political as well as economic.

Certainly, too, one must question whether this present period of widespread unemployment is exactly the time to consider wholesale breaches in our tariff walls.

Although it is, as indicated, too early for a firm appraisal of results, it is significant that in the case of the oldest of the trade agreements, that with Belgium, the figures for one year's operations show that our imports of Belgian goods on which the duties were lowered by the agreement,

PERFECTION
REFRIGERATION PARTS CO.
HARVEY, ILLINOIS



have increased 111% over the previous 12 months.

But on the contrary, our exports to Belgium of goods that have been favored in the agreement with lower Belgian tariff, have increased but 10%.

If this can be taken to mean anything at all, it certainly demonstrates definitely that our foreign friends do not necessarily buy from us if and when we buy from them.

Of course, it was absurd to assume at the outset that this would be the case; past experiences of reciprocal treaties abroad have demonstrated that this is no more true of international business than it is of domestic business, unless the agreements involve governments having a firm control of the training operations of their nationals as in the case of Russia.

The credits established in the United States by foreigners selling here are not at all necessarily used by them for the purchase of American goods.

In fact, there is ample evidence that they are now being used to buy up considerable blocks of American securities because of the dollar exchange situation.

And incidentally in that connection, are we not setting the scene for another catastrophe similar to that in 1929 which was stimulated in part at least by European emergencies, such as the Hatry frauds in England and the crisis in France, resulting in widespread dumping of American securities by foreign holders?

Greatest Benefits May Go to Country Giving Nothing to Us

Another dubious angle to the Hull agreements is the fact that the biggest beneficiaries of our tariff reductions are, in several cases, not the country with which the given agreement was made. The law was drawn to "generalize" the tariff cut to extend it to all foreign shippers of any nationality (excepting Germans and Australians, for certain reasons).

In other words, we are making outright gifts to these other countries, which are not in the given Trade Agreement, without getting anything (Concluded on Page 20, Column 1)

*Address before 23rd National Foreign Trade Convention, Chicago, Nov. 20, 1936.

Factors Other Than Tariff Are of Major Importance, Klein Points Out

(Concluded from Page 19, Column 5)
whatever in return from them. This is certainly carrying the "good neighbor" idea to the height of benevolent, Caspar-Milquetoast philanthropy.

We make an agreement with Switzerland to cut our duty on cotton cloth and behold, the chief beneficiary is Japan.

Similarly, we let our Brazilian friends have a reduction in our tariff on their manganese because of favors which they are extending to us, and it develops that we have really done a big favor to Soviet Russia, which is much the largest foreign shipper of manganese to us—all without any commitment in either of these cases in our favor on the part of Japan or Russia.

We concede to Belgium a lower rate on cement and iron bands but the chief beneficiaries of those are other countries from whom we are obtaining no corresponding compensations.

Truly we have here the quintessence of naive benevolence, even beyond the moonshine largess of Passamaquoddy.

Secretary Wallace says that in the course of these various tariff readjustments any "inefficient" American industry which may suffer will have to take its chances and step aside for the more "efficient" foreign competi-

tors eager to serve our consuming public. All of which raises two rather pointed questions:

1. Just which Washington bureaucrat is so endowed with supererudition as to be able to decide which industry, the American or its foreign rival, is the more "efficient" and therefore deserving of survival?

2. Is it simply involving relative efficiency or, on the contrary, are we asking American industries to compete, not with foreign industries having greater efficiency, but rather with those equipped with far more vicious, illicit weapons—child labor, pauper wages, unsanitary factories, and other ruthless competitive devices which

have long been outlawed in this country?

Foreign Trade Must Depend On Sound Economy at Home

In all of our current discussion on foreign trade, it would be well to establish rather definitely in our minds the distinct priority of certain basic policies far more potent in their reactions upon our commerce, both foreign and domestic, than any experiments with the tariff.

At the forefront of these is the fundamental issue of currency stabilization, including the termination of such wild political maneuvers as the silver purchase policy, so disastrous to the national economy of some of our best foreign customers.

Certainly, too, there can be no doubt that an invaluable contribution to the betterment of our foreign trade would

come with some assurance of taxation relief to American industry, particularly by the elimination of the absurd monstrosity of the 1936 Act with its sweeping penalties upon the accumulation of reserves.

In the last analysis, it is emphatically true, that we can best help our foreign friends by first rehabilitating ourselves.

The Administration's tariff destruction program and its planned scarcity in agriculture are indeed generous and solicitous gestures to our potential customers abroad, and the latter are most certainly taking advantage of them.

But leaving aside any partisan considerations doesn't it seem reasonable that as American business is relieved from the back-breaking tax load of boondoggling, its foreign purchases of raw materials will pick up at once? And will that not immediately bring

in this country more employment and consequently more imports of foreign consumer goods? A healthy foreign trade can be built up by this country without any program of excessive loans abroad and without any sacrifices of domestic industries to foreign competitors through tariff destruction.

And it is obvious that if there is to be any genuine solicitation for our foreign trade in farm products there must be an end to the fantastic policy of planned scarcity in agriculture.

With these and similar domestic business improvements, we can be assured that overseas business will move forward along sensible and constructive lines—as an integral part of our whole business life, sustained, like all commerce, by a sound currency policy and a national tax program, and not as a strange and isolated phenomenon, quite foreign to the rest of our national economy.

Table of Dollar Value of Refrigeration Exports - - Household, Commercial, and Parts - - for Years 1933-36 Shows Doubling of That Market in Three Years

Countries	Household Refrigerators				Commercial Units (Up to 1 Ton)				Parts			
	1933	1934	1935	1936*	1933	1934	1935	1936*	1933	1934	1935	1936*
Austria	4,154	14,370	24,849	26,791	228	3,221	11,893	6,551	4,245	6,033	14,759	25,751
Azores and Madeira Islands	67	409	1,058	1,342	...	673	856	...	...	136	186	...
Belgium	82,422	88,862	156,081	164,395	77,507	74,812	93,974	64,619	94,946	80,728	104,534	85,446
Bulgaria	436	808	954	574	...	650	...	...	60	250	2,072	1,102
Czechoslovakia	7,268	24,923	12,566	34,209	6,075	8,356	2,629	4,175	36,651	31,180	48,434	64,151
Denmark	2,520	1,406	437	685	9,375	24,322	7,288	1,416	16,046	19,653	21,681	21,903
Estonia	...	...	...	...	...	...	...	...	52	748	85	...
Finland	2,476	10,865	12,931	15,725	1,496	12,980	16,233	11,550	1,589	12,604	24,329	27,662
France	290,266	979,247	785,737	488,530	172,638	399,373	226,765	193,944	265,471	462,939	376,923	363,943
Germany	44,036	96,130	7,352	2,541	31,640	12,769	9,248	217	126,426	130,410	112,817	1,848
Gibraltar	278	3,470	3,110	3,281	440	1,388	2,020	434	60	850	1,927	762
Greece	8,149	34,654	41,044	19,865	...	1,809	4,920	11,074	252	1,815	8,444	6,601
Hungary	63	1,818	1,048	225	...	418	1,268	...	...	26	531	409
Iceland	1,033	1,124	...	...	...	113	...	...	7	196	...	...
Irish Free State	2,504	21,688	30,107	62,549	36,577	85,299	29,956	17,843	4,690	16,053	5,775	4,649
Italy	67,458	162,541	79,965	65,805	31,968	49,051	42,488	6,215	49,892	94,434	79,689	16,229
Latvia	...	...	352	...	...	...	...	...	...	...	67	...
Lithuania	...	...	102	460	...	...	...	...	...	...	...	...
Malta, Gozo, and Cyprus	1,974	2,192	863	1,131	...	198	172	...	29	51	177	339
Netherlands	91,801	113,524	145,204	159,175	56,312	72,722	51,432	73,943	66,320	113,775	92,200	86,435
Norway	28,217	55,965	71,696	96,837	10,217	22,260	39,014	20,064	9,510	17,644	39,014	38,562
Poland and Danzig	1,927	2,256	1,753	1,086	1,978	2,040	620	271	1,677	2,013	1,381	840
Portugal	10,426	16,708	19,812	15,980	4,851	5,877	7,424	3,086	3,870	6,820	7,528	4,076
Rumania	3,766	18,081	10,834	11,220	197	...	485	66	2,361	5,440	10,587	7,427
U.S.S.R. (Russia)	1,337	637	4,476	12,930	...	390	237	...	13	...	1,232	84,990
Spain	53,539	198,957	173,764	157,727	18,808	47,784	81,544	59,061	32,881	93,532	79,167	51,831
Sweden	48,631	110,804	182,894	155,810	20,341	46,261	69,038	43,003	35,188	58,902	120,897	110,431
Switzerland	78,541	94,921	45,554	73,262	46,255	53,514	1,973	1,113	122,699	169,006	121,339	41,994
Albania	94	...	99	782	...	...	...	...	...	...	...	...
United Kingdom	403,522	842,524	896,728	1,805,483	142,876	362,385	359,577	259,047	287,105	479,064	593,988	1,174,601
Yugoslavia	7,216	7,505	6,830	3,707	6,203	2,764	6,748	7,886	3,898	3,195	3,058	3,955
Canada	136,219	257,150	242,756	610,763	45,904	133,736	103,331	105,862	173,252	581,398	500,097	766,814
British Honduras	799	4,225	2,851	1,716	...	...	...	...	65	529	618	276
Costa Rica	3,964	5,170	8,331	7,003	223	1,137	...	2,168	313	425	582	1,319
Guatemala	2,550	3,918	13,014	11,912	465	337	492	957	822	495	2,417	1,034
Honduras	12,265	16,023	15,463	8,564	1,375	1,174	5,275	1,327	1,246	1,174	5,009	896
Nicaragua	4,954	3,841	1,554	5,321	...	1,371	493	...	352	359	1,025	283
Panama	72,476	69,029	86,512	87,797	12,942	17,731	20,566	21,700	17,684	19,308	40,639	18,743
Salvador	7,303	8,947	5,723	11,036	567	...	3,209	527	1,173	427	1,185	959
Mexico	114,380	180,267	308,227	343,161	8,702	15,445	32,754	38,291	53,044	58,651	72,258	62,470
Newfoundland and Labrador	1,858	2,690	6,015	9,901	735	1,350	995	2,045	192	667	366	1,232
Bermuda	27,669	32,207	35,370	37,482	7,723	7,054	4,246	7,359	3,735	5,703	4,712	5,618
Barbados	12,034	7,177	9,851	7,748	616	2,287	686	...	819	719	789	1,933
Jamaica	14,172	11,316	13,415	11,462	1,064	1,885	1,185	730	564	2,128	3,575	776
Trinidad and Tobago	3,678	17,580	24,171	16,349	180	194	1,317	826	910	838	1,653	1,597
Other British West Indies	11,511	7,895	12,418	9,636	200	1,315	4,541	2,511	1,434	1,637	2,288	2,615
Cuba	57,113	115,900	194,692	302,421	7,192	15,080	47,333	58,775	13,186	28,670	74,736	59,945
Dominican Republic	27,270	20,269	18,224	16,176	972	1,186	1,340	1,800	940	1,509	1,509	1,314
Netherlands West Indies	19,590	32,981	61,887	76,071	2,354	5,835	7,968	7,495	1,381	3,410	14,095	7,803
French West Indies	4,499	10,405	15,858	9,481	361	...	918	557	2	142	1,096	704
Haiti, Republic of	2,860	9,400	22,844	8,061	116	456	1,610	424	1,035	308	1,685	4,411
Argentina	203,471	144,810	189,890	184,283	52,711	43,254	61,581	20,616	162,241	123,928	142,698	153,668
Bolivia	...	686	2,961	6,839	...	...	232	...	...	...	288	307
Brazil	401,106	642,361	691,191	408,451	50,121	37,777	82,910	119,505	62,668	110,320	129,782	90,689
Chile	7,604	17,981	60,877	25,084	281	714	12,099	2,068	1,155	3,096	3,944	6,471
Colombia	39,562	58,367	124,574	162,175	3,925	6,477	14,409	19,073	3,677	5,020	10,001	11,243
Ecuador	2,052	8,528	14,497	18,842	...	...	259	738	22	490	830	999
British Guiana	2,986	10,260	8,018	5,786	462	100	...	...	152	1,178	1,052	398
Surinam (Dutch Guiana)	3,943	19,228	4,629	3,713	...	466	...	...	116	828	426	228
French Guiana	...	397	...	...	...	...	...	...	...	57	...	99
Paraguay	...	981	3,386	3,760	...	...	...	...	...	25	125	424
Peru	14,231	34,741	67,741	61,392	...	6,532	6,412	7,695	3,086	4,529	7,870	10,417
Uruguay	21,129	27,978	19,206	30,940	2,013	9,041	14,511	12,911	8,852	10,827	16,403	17,134
Venezuela	39,636	78,380	134,949	149,828	5,940	9,016	6,436	12,681	2,785	5,488	7,574	8,689
Aden	959	118	5,055	3,082	177	336	574	874	95	202	205	1,628
Arabia	...	272	1,801	1,713	...	...	...	260	736	12	916	1,205
British India	151,728	216,708	227,059	208,847	26,236	32,339	47,852	56,440	52,817	61,919	108,891	60,537
British Malaya	36,358	95,381	134,007	113,171	2,045	9,982	8,019	26,232	4,238	17,038	17,473	14,916
Ceylon	9,839	14,966	33,204	19,250	1,552	941	1,664	...	3,827	4,793	4,903	4,528
China	102,191	133,876	158,095	82,949	6,118	12,402	20,536	4,238	17,000	54,635	27,755	10,316
Netherlands East Indies	146,926	200,602	258,006	149,482	44,167	16,452	47,093	24,281	16,360	23,830	39,875	29,182
French Indo-China	4,863	24,882	81,248	40,303	3,475	145	1,510	2,423	15,533	2,285	9,000	11,516
Hong Kong	35,992	39,550	57,509	35,246	8,578	3,982	8,749	2,336	4,729	8,581	9,416	4,075
Iraq	160	790	200	15,326	...	145	...	...	884	20	117	585
Japan	16,078	26,980	21,745	22,371	8,852	15,753	14,740	16,074	45,882	52,744	49,685	40,144
Kwantung	6,766	8,591	14,985	4,349	1,173	344	2,711	...	1,096	1,940	1,902	29
Palestine	22,470	85,800	242,652	232,614	12,580	31,336	73,760	47,467	7,539	35,314	89,632	43,940
Persia (Iran)	...	365	510	96	...	122	...	...	...	...	978	...
Philippine Islands	90,207	90,580	118,720	133,123	31,316	19,007	24,626	18,174	15,198	73,610	28,423	22,801
Siam	8,422	6,052	9,877	17,848	...	2,712	1,847	...	849	380	417	361
Syria	4,805	7,299	13,896	28,090	1,034	2,813	8,033	10,531	390	1,302	4,142	6,016

Harrison Defines New Attitudes Towards Problems Facing International Trade

By L. S. Harrison*

Assistant to President, International Business Machines Corp.

OUR national prosperity and welfare are, as has been too painfully demonstrated, irrevocably tied up with the rest of the world.

Science and invention have contracted geographical distances so that international relationships are now definitely interlocked.

The United States cannot live by itself alone—is not living by itself now—and never has done so.

We have a tremendously costly stake in our foreign relationships.

Our citizens, as well as our government, have underwritten our present position in World Trade to the tune of over 12 billion, five hundred million dollars of foreign investments, represented, to a large extent, by stocks and bonds distributed far and wide in this country among banks, insurance companies, universities, and individual holders.

In addition, foreign governments owe this government 11 billion dollars on account of war debts.

Prior to 1929, we were able to maintain our traditional excess of exports over imports by making it possible to foreign countries to pay their bills with money we loaned to them.

We have maintained the excess since, but at the cost of trade volume which in 1928, regardless of whom the trade balance favored, supported 2,400,000 American families!

The stark reality today is that we have projected a credit balance abroad of 23 billion dollars.

How are we going to collect it?

How Can We Meet

The Debt Situation

In June of this year the combined gold reserve of all countries of the world was a little less than 21½ billions of dollars of which approximately half was held by the United

States. Most of the other nations have hardly enough gold left to serve as a base for their currencies.

These are the bare facts which leave us, as a nation, only two choices—either the United States must abandon its position as a creditor nation, cancelling claims to a major part of its loans and investments, or—

It must permit freer access to its markets for foreign goods.

It must be clear to all thinking people that our institutions, citizens and taxpayers cannot stand the liquidation of this indebtedness themselves without serious effect on business convalescence.

Knowing, as we do, that the effect of such liquidation will surely infiltrate down into the welfare of our people, the interests of this country demand the formulation of a foreign policy which will foster, increase and build up our foreign trade.

Business Leaders Must Share Program to Promote Trade

The responsibility for such a policy cannot rest alone in the government of our country but should be shared by its business and financial leaders.

It calls on merchants, bankers, industrialists and every responsible agency, if not for support, at least for the encouragement of an honest understanding on the part of the public that this question is one where real patriotism demands the cooperation of all, and intelligent treatment without partisanship.

The isolationist calls this kind of talk "un-American," but he still takes his coffee in the morning, puts on his rubbers when it rains, wears a silk necktie and and reads protectionist editorials on newsprint from Canadian pulp.

We cannot have our cake and eat it too.

It is impossible to sell our goods to others and not buy from others.

Our abundance of national resources has provided surpluses, the disposal of which has resulted in artificial policies in which no school of thought really believes—policies which have either been made or thought necessary, only because of the lack of an adequate avenue of export for our surplus goods.

In the seven year period between 1927 and 1933 the United States exported to foreign countries of its total production:

Cotton	56%
Tobacco	38%
Wheat	32%
Copper	43%
Industrial machinery	17%
Typewriters	40%
Office appliances	28%

This is but a small section of the list which is eloquent testimony of how much we depend on our customers abroad.

These figures being what they are, it does not require difficult reasoning to prove that such foreign sale of our surplus agricultural and mining products creates a substantial demand at home for our own manufactured goods. It represents a vital and essential sector of domestic business recovery.

Exports May Mean Profit-Loss Factor in Many Industries

American mass production technique also being what it is there are surpluses of our own manufactured goods which cannot be ignored—much of this surplus, over domestic demand, has at times constituted the difference between profit and loss in certain industries.

A large proportion of American manufactured products, having the benefit of American mass production efficiency, is fully competitive, if not discriminated against, in foreign markets.

We can and will compete in foreign markets on an open, self-reliant basis of quality, value and price.

But—if anything like prosperity is to be achieved and sustained it is imperative that the United States find broader markets beyond her boundaries or undergo continuous adjustment, limitation and artificial control of her productive capacity.

On the other hand, to continue factory operations in its own industries

this country must have many absolutely essential materials which cannot be obtained here either in sufficient volume or at all.

Rubber, tin, nickel, manganese, aluminum, tungsten, nitrate, drugs and medicine—if we did not have these things and many others from foreign countries there would be little need for any conference on distribution.

Our automobiles, steel products, household goods, electric lights, telephones, radios, fountain pens, and a host of American manufactured commodities which contribute so much to our standard of living would in cost and quality be out of reach of the majority of our people.

Just two more facts need to be emphasized to demonstrate, finally, the basic importance of this to our happiness and prosperity.

In 1929 our foreign trade, both export and import, was 9 billion, 640 million dollars.

In 1935 it was 4 billion, 330 million dollars, a loss of 5 billion, 310 million dollars to American manufacturers, merchants, transportation, mining and agriculture.

Again—of the 48 million, 800 thousand people gainfully employed, as shown by the United States Census of 1930, between 4 and 5 million, or about 10%, were dependent on jobs created by exports and imports.

This means that, considering its indirect effect, 11 millions of our population found employment through the contributions of foreign trade.

To put back into employment the substantial portion of these people whom the shrinkage of foreign trade has robbed of their livelihoods is an obligation which can be satisfied only by the support of those economic policies that are not born solely of narrow self-interest but which tend to serve the greatest good of all classes of producers and consumers alike.

No one advocates opening our gates to either labor or the products of peonage—but there is such a think as subsidizing inefficiency and progressive cost of reduction methods through prohibitive tariffs on imports, just the same as restrictions and barriers against United States exports to other countries destroy the great competitive value, in both cost and quality, of hundreds of devices manufactured here at home.

I do not like the words "favorable" or "unfavorable" in connection with foreign trade balances.

If so-called "favorable" trade balance policy will continue to hold back the volume of business in both directions, as it will under present conditions, and freeze our foreign investments and loans, I should call that balance "unfavorable."

While it is clear that a so-called "unfavorable" trade balance will help more quickly to liquidate our vast credit position, the main objective of our foreign trade policy should be to so accept and apply the unfavorable balance idea as to accelerate the total trade volume in both directions toward its return to what it once was, and more.

This means increased prosperity abroad.

But what is that to us?

Only the melting of frozen war debts and bond issues, relief to our internal debt structure and, what is the greatest of all, a practical contribution to peace on earth and good will toward men.

I cannot seem to identify that viewpoint with the importance of where toys and perfumes sold in America are made.

This whole question of foreign trade and a fair distribution of international prosperity is at the roots of depreciated currencies, the race of armament, war and upheavals.

Political philosophies throughout the earth derive their character solely from economic stress.

But people of all nations still must

eat, live, work and transact business.

Goods are still being manufactured, the soil is still being tilled, contracts are still made and respected.

But, beyond that, the laws of nature and human rights and economy find their own solutions and compensations—not to please you or me or any special group, community, class or nation, but to equate themselves and find equilibrium.

Artificial barriers only serve to increase the impact of forces which cannot eventually be confined.

These obstacles must be dissolved. Whether the dissolution is to be violent and destructive, or peaceful and constructive, depends on human intelligence alone.

Movements on Foot to Aid International Trade

The task of relieving international pressure is a heavy one, but not hopeless by any means.

Valuable effort is being put forth to develop cooperation and understanding between business men throughout the world which is attaining increased significance.

The work of the International Chamber of Commerce is outstanding in this respect.

Mr. Elliot Wadsworth, President of the Boston Chamber of Commerce and Vice President of the International Chamber, is one of the most important men carrying on this work.

Last year, through the combined efforts of Mr. Thomas J. Watson of New York, President of the American Section of the International Chamber, and Dr. Nicholas Murray Butler, the Carnegie Foundation for International Peace and the International Chamber of Commerce joined forces in sponsoring a committee of experts from leading nations in a world economic survey, which is now under way, and is directed toward establishing a factual foundation of currencies, opening of trade barriers, and the rational limitation of armaments.

Our own country has instituted a reciprocal trade agreement policy which is scientific and flexible, tending to remove the causes of foreign relation, embargoes and exchange restrictions, and to revive for American enterprise its natural markets abroad, as well as reasonably to protect our own industrial and agricultural interests.

The trade agreement program of the United States government is today a practical and progressive method of furthering our foreign trade.

Designed on an open-handed, thoroughly-mutual basis, it serves, without dislocation of domestic industry, to prevent discrimination against us in the application of tariffs and quotas, and insures uniform concessions and similar treatment on both sides.

This policy provides no real basis for cleavage of opinion.

It serves no school of thought with respect to free trade or protectionist philosophies.

It is based on informed compromise and is inspired by the same old Yankee Clipper instinct which insisted on full cargoes over and back again.

There is also a great and profitable opportunity for the organization of facilities at our ports in warehousing, financing and forwarding through the agency of Free Zones for Foreign Trade.

The important thing now is to focus the attention of business men upon this problem, to induce them to study it and to further the accurate popular understanding of a question which is greatly distorted and misunderstood.

Our country can well afford to take the leadership in this movement, and when that leadership is proved, we will have forged a powerful link in the chain of world friendship in which armaments will yield to common sense in international relations.

Dollar Volume of Air-Conditioning Exports Totals \$636,446 for Nine Months of 1936

U. S. Bureau of Foreign and Domestic Commerce Statistics on Exports of Air-Conditioning Equipment, Including Portable, During First Nine Months of 1936

Countries	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Totals
Austria	521	1,251	1,491	907	819	366	1,759	2,180	77	9,005
Belgium	...	...	...	...	...	...	100	40	...	140
Czechoslovakia	...	...	230	...	101	197	...	...	115	643
France	4,943	324	2,370	5,717	1,620	34	12,517	4,337	2,503	34,365
Germany	...	38	...	137	...	325	...	...	...	3,999
Greece	...	...	243	1,179	1,095	...	1,193	...	289	599
Hungary	...	16	...	...	...	...	...	...	...	16
Irish Free State	...	...	...	...	...	...	...	96	779	875
Italy	...	...	455	...	1,363	...	5,842	...	...	7,660
Netherlands	920	...	...	1,105	1,529	...	228	1,383	155	5,380
Norway	...	213	...	183	209	266	260	242	...	1,373
Poland and Danzig	135	...	150	...	...	...	112	...	...	285
Portugal	739	475	...	...	...	10,889	110	...	61	11,886
Soviet Russia (U.S.S.R.)	...	1,087	...	...	32	441	300	...	...	1,163
Spain	712	1,332	218	1,767	592	777	377	975	1,769	8,519
Sweden	...	...	...	...	...	...	96	...	...	96
Switzerland	3,029	1,884	1,568	6,235	6,652	16,177	2,551	856	2,544	41,496
United Kingdom	2,922	2,662	8,037	19,069	5,040	21,052	8,763	25,411	7,955	100,911
Canada	...	...	...	...	...	...	...	25	...	25
British Honduras	...	...	...	...	...	...	...	69	...	69
Costa Rica	...	...	...	...	...	...	...	...	15	15
Guatemala	...	...	...	...	...	...	...	...	...	995
Honduras	...	...	...	...	...	...	...	...	150	232
Nicaragua	...	...	...	...	...	...	...	...	...	5,828
Panama	...	...	...	...	...	...	...	...	...	595
Salvador	...	...	184	...	342	...	...	...	...	24,619
Mexico	907	3,922	58	2,973	2,173	4,853	4,163	4,212	1,358	150
Newfoundland and Labrador	...	...	...	...	...	...	150	...	...	862
Bermuda	552	...	...	54	158	...	...	...	45	31
Jamaica	...	...	...	...	...	...	...	...	...	559
Trinidad and Tobago	...	...	...	...	...	...	...	...	...	144
Other British West Indies	76	...	...	...	...	68	...	...	...	590
Cuba	...	116	...	236	528	120	3,091	878	933	949
Dominican Republic	...	864	...	...	...	...	...	11	74	787
Netherland West Indies	...	...	113	...	...	...	85	514	19	84,801
Argentina	276	51,216	10,968	11,356	862	600	2,646	708	6,169	260
Bolivia	...	...	...	...	...	...	...	...	...	53,689
Brazil	14,819	4,506	1,854	2,776	8,594	3,769	10,646	765	5,961	5,332
Chile	266	700	3,997	...	56	...	...	...	313	4,126
Colombia	240	132	...	...	960	63	...	1,670	1,061	156
British Guiana	...	...	38	...	...	118	...	...	...	82
Ecuador	...	...	...	...	...	...	...	...	...	5,416
Peru	565	224	107	...	1,836	463	39	...	2,182	7,555
Uruguay	...	...	7,376	...	85	...	94	...	353	12,430
Venezuela	...	...	...	...	11,997	685	...	25	...	295
Aden	...	...	...	...	...	...	...	...	...	7,975
Arabia	...	...	...	...	...	...	7,870	...	105	23,886
British India	138	1,659	852	6,049	2,156	332	11,612	...	1,088	5,674
British Malaya	...	...	871	1,704	...	...	999	...	2,100	265
Ceylon	265	...	...	...	...	...	...	...	...	23,997
China	11,523	2,047	5,495	...	215	2,367	494	1,571	500	14,079
Netherland East Indies	354	512	...	...	...	3,072	3,806	5,646	211	5,147
French Indo-China	...	...	66	1,693	...	...	3,388	...	...	3,288
Hong Kong	...	...	...	...	686	...	2,352	...	250	482
Iraq	...	280	...	...	...	...	34	168	...	8,640
Japan	...	1,008	3,420	268	42	...	495	1,369	2,038	1,742
Palestine	...	646	347	235	...	170	...	...	318	15,650
Persia (Iran)	...	...	...	...	...	...	...	...	...	52
Philippine Islands	2,315	...	461	803	262	2,874	5,380	1,565	1,990	1,525
Siam	...	...	176	...	433	324	29	563	...	455
Syria	...	...	...	...	...	...	455	...	...	11,556
Turkey	...	...	...	...	...	...	...	175	...	58
Australia	1,259	752	84	470	995	2,590	1,598	1,922	1,886	9,253
British Oceania	...	...	...	...	...	...	...	...	...	196
French Oceania	...	...	...	...	...	...	...	...	...	49,486
New Zealand	180	...	597	201	3,159	196	313	1,502	3,279	857
Belgian Congo	...	...	...	...	...	...	...	...	...	301
Union of South Africa	1,214	913	1,125	5,748	23,013	8,474	5,962	...	3,137	1,118
Nigeria	...	...	...	...	...	...	...	857	...	54
Egypt	9	417	117	47	71	...	156	...	...	81
Algeria and Tunisia	639	180	83	1,034	304	...	263	...	...	612
Other French Africa	...	...	...	...	...	...	...	...	...	208
Liberia	...	12	...	...	300	...	...	300	...	61
Mozambique	...	...	...	...	...	149	59	...	...	...
Canary Islands	...	...	...	61	...	...	...	...	...	...
Total	49,780	79,388	53,799	72,663	79,342	86,480	100,336	61,328	53,330	636,446
Shipments to: Hawaii	645	692	18,118	5,715	2,825	2,172	7,150	5,578	3,001	45,896
Puerto Rico	66	193	160	192	179	488	465	594	1,215	3,492
Virgin Islands	...	...	...	...	...	...	120	...	...	120

Why Gamble?

USE AERO

SELF-ALIGNING SEALS

Seat and Seal Immediately!

Fully Guaranteed!

Easy to Install!

Save Time, Trouble and Money!

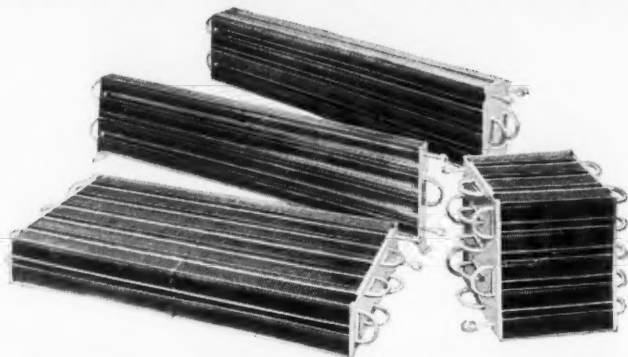
"THE LONGER THE WEAR - THE BETTER THE SEAL"

COVERED BY U.S. PATENT
ALLOWED OCT. 26, 1936
OTHER PATENTS PENDING

AERO PRODUCTS CORPORATION
36-08-34th St., Long Island City, New York

The Buyer's Guide

"Peerless for Performance"



"WHERE THERE ARE NO JOINTS—
THERE CAN BE NO LEAKS"

Full length tubing is used in all Peerless Fin Coils. The return bends are bent of the same tubing to which the fins have been applied. No soldered return bends to deteriorate and leak. "No joints—no leaks." A fin coil for every purpose. Write for complete catalog.

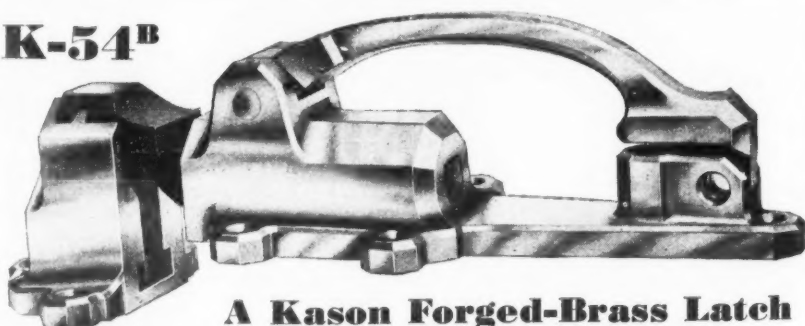
PEERLESS ICE MACHINE COMPANY

CHICAGO
515 W. 35th St.

TWO FACTORIES
Cable address
PEERCOILS-DETROIT
Representatives in all Principal Cities

NEW YORK
43-00 36th St., L.I.C.

K-54B



A Kason Forged-Brass Latch of Unsurpassed Quality

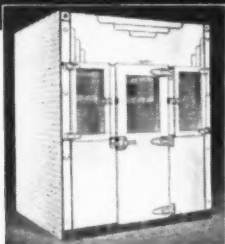
For simplicity of construction, ease of operation, rugged strength and massive sealing power there is no latch which compares with K-54B. This, the largest of KASON'S comprehensive line of refrigerator latches, is the standard size for heavy, walk-in doors. Its unsurpassed quality has been emphatically demonstrated in many years of faultless, gratifying service.

KASON MANUFACTURES THE WORLD'S FINEST HARDWARE
FOR EVERY COMMERCIAL REFRIGERATOR NEED

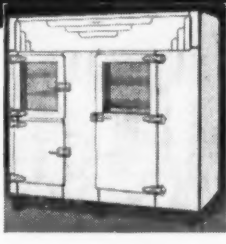
KASON HARDWARE CORPORATION

127-137 Wallabout St., BROOKLYN, N. Y.

DISTRIBUTORS WANTED



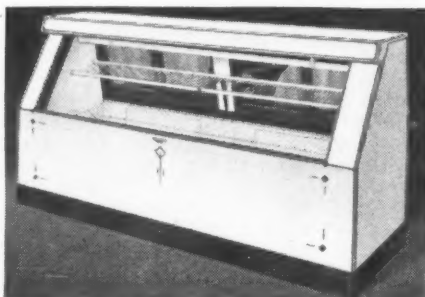
Percival equipment
meets every require-
ment of the modern
food store.



For mechanical
refrigeration only.

Percival's complete line of display cases, reach-in refrigerators, walk-in coolers, chests, etc. will increase your sales of electrical refrigeration equipment and offer added earnings.

Desirable territories still
available. Write for com-
plete information.



C.L. PERCIVAL CO.
DES MOINES, IOWA

Operating Characteristics of Williams Absorption System Operating on Low Pressure Steam Given by Zellhoefer

NEW YORK CITY—Operating characteristics of the Williams absorption refrigeration system which operates with low pressure steam were outlined last Friday by G. F. Zellhoefer, Williams Oil-O-Matic Heating Corp., before the final technical session of the annual A.S.R.E. convention.

The unit which Mr. Zellhoefer described has been developed to meet refrigeration requirements in air conditioning, and is designed to operate on low pressure steam or hot water. The solvent used is dimethyl ether of tetraethylene glycol $\text{CH}_3(\text{OCH}_2\text{CH}_2)_4\text{OCH}_3$ and the refrigerant is dichloromono-fluoromethane (CHCl_2F).

Both chemicals, the speaker claimed, are essentially non-toxic, non-irritant, non-corrosive, non-inflammable, chemically stable, chemically inert and have a low specific heat with a high coefficient of heat conductivity.

The latent heat of vaporization, the solubility characteristics, and the vapor pressure of dichloromono-fluoromethane differs greatly from that of dichlorodifluoromethane (Freon-12), but the other chemical and physical properties of the chemicals are similar. The boiling point of the solvent is 505 to 511° F. at atmospheric pressure. The specific gravity at 75° F. is 1.007 and the specific heat at 75° F. is 0.513.

Operating Conditions Rated

The Williams units are rated under the following operating conditions:—85° F. inlet cooling water, 95° F. outlet cooling water, 10 lb./in.²g. steam pressure and 40° F. saturated refrigerant temperature in the cooling coils. The characteristics of a unit operating under these conditions are given in Table 1.

By using Fig. 1, said Mr. Zellhoefer, the steam requirements and the capacities of a nominal 5½-ton unit may be determined through a wide range of operating conditions. The dotted line indicates the capacities and steam requirements at the operating conditions specified for nominal rating.

Under these conditions this unit has a capacity of 5.55 tons and the steam requirements are 116½ lb./hr. or 21lb./hr./ton. The heat in condensing 21 lb. of steam at 10 lb. pressure is 20,034 B.t.u.

The thermal efficiency of this unit at these operating conditions is 60%. Operating conditions that increase the capacity also slightly increase the thermal efficiency.

Through this 5½-ton unit there was circulated 36 gal./min. of cooling water. At this rate of flow, there was a 10° F. rise in temperature of the water when the unit developed its rated capacity of 5.55 tons.

Hp. for Units Remains Constant

The turbine type pump, explained the speaker, is used to circulate the strong liquor from the absorber through the heat exchanger to the heater. As indicated in Table I, the hydraulic horse power is 0.0315 and the total horse power 0.09 per ton of refrigeration at operating conditions specified for the nominal rating of the unit. This horse power requirement for a unit remains essentially constant, declared Mr. Zellhoefer, regardless of operating conditions and the corresponding refrigeration capacity.

Under the operating conditions specified for the nominal rating of the unit, said the speaker, the temperature of the weak liquor leaving the heater is 232° F., and the pressure in the heater is 28 lb./in.² gage. Based on this temperature, the vapor pressure at 28 lb./in.² gage is 0.05% of the total pressure.

In a mixture of the solvent and refrigerant vapors at this temperature and pressure the percent by weight of solvent vapors is theoretically 0.11%.

In practice it is found that percentage by weight of solvent carried into

the rectifier is approximately 0.18% or 0.04 lb./min./ton, he said.

The latent heat of vaporization of the solvent is 100 B.t.u./lb. and the heat absorbed by the cooling coil in the rectifier to condense this solvent is 4 B.t.u./min./ton.

The total heat absorbed in the rectifier to condense the solvent and cool the refrigerant vapors from 192° to 140° is 22 B.t.u./min./ton. When the vapors are cooled to 140°, essentially all the solvent vapors are condensed out and the refrigerant vapors enter the condenser free of solvent.

Function of Rectifier

If the absorption refrigeration unit were not equipped with a rectifier, said the speaker, there would be approximately 0.2% of solvent in the liquid refrigerant. If this mixture of solvent and refrigerant were vaporized in a dry expansion coil operated with an 8° F. superheat this solvent would hold in solution approximately 1% of the refrigerant and this solution of solvent and refrigerant would be returned to the absorber as a liquid, thereby losing the refrigeration effect of 1% of the refrigerant circulated.

Capacity Chart

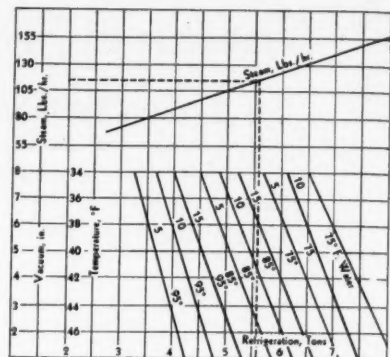


Fig. 1—Chart for determining steam requirements and capacities over wide range of operating conditions.

Other than this loss of efficiency and capacity there would be no difficulties involved.

However, at high heater temperatures, the loss of efficiency and capacity would be increased. For example, at a heater temperature of 250° F. the loss would be 3½%.

The rectifier used is designed to maintain an outlet temperature of 140° F. in the vapor leaving the rectifier with a heater temperature of 255°, and under operating conditions that increase the capacity of the unit as much as 60% above the nominal rating.

The rate of flow of water through the rectifier is governed by a thermostatically controlled water valve actuated by the temperature of vapor leaving the rectifier.

From Table I may be determined the required size of each part of the absorption refrigeration unit. The overall dimensions depend on design. In the Williams design of the 20-ton unit the overall dimensions are 48 in. x 48 in. x 72 in. high, including the condenser.

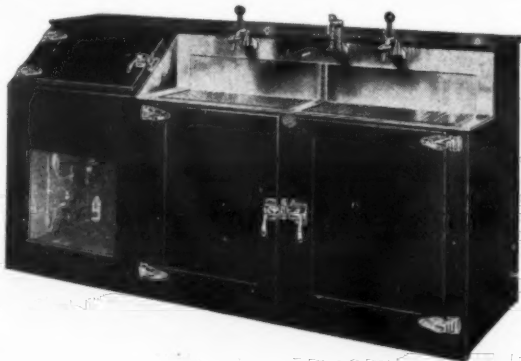
Table 1—Characteristics of Unit Operating Under Specified Conditions

Cooling water entering absorber, °F.	85
Cooling water leaving absorber, °F.	90.6
Cooling water entering condenser, °F.	90.6
Cooling water leaving condenser, °F.	95
Cooling water entering rectifier, °F.	90.6
Cooling water leaving rectifier, °F.	95
Volume of cooling water gal./min./ton.	6.4
Temperature rise in cooling water passing through the unit, °F.	10
Heat dissipated in the cooling water, B.t.u./min./ton.	533
Pressure drop of water in passing through the unit, lb./sq. in.	10
Weak liquor temperature entering absorber, °F.	108
Strong liquor temperature leaving absorber, °F.	95
Weak liquor temperature leaving heater, °F.	232
Strong liquor temperature entering heater, °F.	192
Gaseous refrigerant entering rectifier, °F.	195
Gaseous refrigerant leaving rectifier, °F.	140
Liquid refrigerant leaving condenser, °F.	98
Condenser pressure, lb./sq. in.	28
Low side pressure, in. Hg. vacuum.	5
Pressure at pump outlet, lb./sq. in.	58
Pressure at heater nozzles, lb./sq. in.	36
Pressure on absorber float valve, lb./sq. in.	5
Pressure on absorber nozzles, lb./sq. in.	5
Total pressure on absorber nozzles, lb./sq. in.	7.5
Steam required at 10 lb./sq. in. pressure, lb./hr. ton.	21
Theoretical hydraulic horse power required for circulating the strong liquor per ton	0.0315
Total horse power required for circulating the strong liquor per ton	0.09
Circulation of weak liquor per minute per ton (theory), gal.	0.48
Circulation of weak liquor per minute per ton (actual), gal.	0.64
Circulation of strong liquor per minute per ton (theory), gal.	0.68
Circulation of strong liquor per minute per ton (actual), gal.	0.90
Circulation of refrigerant lb./min.	2.25
Prime surface on the heater coil per ton of refrigeration capacity, sq. ft.	3.5
Extended surface on heater coil per ton of refrigeration capacity, sq. ft.	14.00
Prime surface on the condenser coil per ton of refrigeration capacity, sq. ft.	4.00
Extended surface on condenser coil per ton of refrigeration capacity, sq. ft.	16.00
Prime surface on absorber coil per ton of refrigeration capacity, sq. ft.	4.00
Extended surface on absorber coil per ton of refrigeration capacity, sq. ft.	16.00
Prime surface on rectifier coil per ton of refrigeration capacity, sq. ft.	0.40
Extended surface on rectifier coil per ton of refrigeration capacity, sq. ft.	2.00
Surface on inner tube of heat exchanger per ton of refrigeration, sq. ft.	0.90
Approximate weight of unit per ton capacity, lb.	300

Meeting a Long Way from Headquarters



(1) James Hood, Ansul Chemical Co., Marinette, Wis.; (2) Frank Riley, American Injector Co., Detroit; (3) L. C. McKesson, Ansul Chemical Co.; (4) H. V. Higley, Ansul Chemical Co.



BIG SALES OPPORTUNITY SUPER-COLD ELECTRIC HI-PRESSURE BEER DISPENSER

Saves 20-10 oz. Glasses on
Every Half Barrel

Complete with compressor and air pump

100,000 RED HOT PROSPECTS
LOW LIST PRICES HEAVY DISCOUNTS

For Franchise write

THE SUPER-COLD CORPORATION, 1020 East 59th Street, LOS ANGELES, CALIFORNIA

Branches and Stocks at:

32-27 QUEENS BLVD., LONG ISLAND CITY, N. Y.
2021 COMMERCE ST., DALLAS, TEXAS

540 N. LA SALLE St., CHICAGO, ILL.
268 GRAYS INN RD., LONDON, W. C. 1

Air Conditioning Made Easy

By F. O. JORDAN

Methods Used in Installing Steam Heating Systems

SECTION NO. 7 Heating (Continued)

Miscellaneous Typical Connections

The various types of connections illustrated in this section do not necessarily apply to one particular type of system, but are commonly used in order to obtain the requirements which have been mentioned regarding air pockets, water-logging, expansion of piping, etc.

Boiler steam connections must be made so that the steam-flow to the system is unrestricted, and so that water which is carried over from the boiler with the steam will be returned to the boiler immediately before it can pass to the distribution system.

Water may be carried over with the steam if the boiler is forced to a very high steaming rate, or if the water in the boiler contains impurities which cause "priming" or excessive "foaming" of the water in the boiler.

Condensate return connections to the boiler must be made so that any air which may be present in the returns is allowed to escape from the system, and so that the condensate will return against the boiler pressure.

In all cases in the following dia-

grams, arrows denote the slope of the pipe, not necessarily the direction of flow.

Fig. 3 shows the simplest possible boiler connection, one pipe connection forming both steam and return connection. This method may be used for very simple one-pipe gravity system. The steam passes from the boiler to the heating surface, while the condensate must return through the same pipe against the steamflow, therefore, the pipe must be sloped toward the boiler as indicated by the arrow.

Figs. 4 and 5 show two methods of taking off the boiler steam connection. Fig. 4 shows a type of connection in which no provision is made for returning immediately to the boiler any water which may be carried over with the steam.

Fig. 5 shows a type of connection where provisions have been made for returning such water by means of a "drip."

This drip line, when properly connected into the return system, also forms an "equalizing" line for equalizing the pressures, thus assisting in the return of condensate returns to

Simple Systems

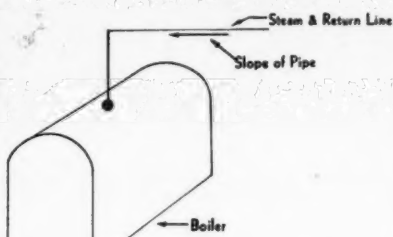


Fig. 3—One-pipe boiler connection for supply and return.

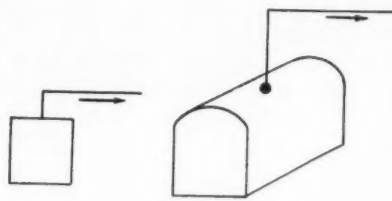


Fig. 4—This connection provides no immediate return of water carried away with steam.

the boiler, and in maintaining a steady boiler water line.

In Fig. 6, the drip and equalizing line from the steam header is shown. Since the "dry" return main carries both condensate and air, it must be provided with an air valve to eliminate the air before it drops below the water level which is carried in the return system.

The "wet" return main requires no air valve, since, as its name implies, it carries only condensate. However, all equipment and all dry returns must be properly vented before dropping to the wet return. The type of boiler connections shown by Fig. 6 may be used with gravity or vapor systems.

The method of connecting to the boiler as shown by Fig. 7 is commonly preferred to the type shown in Fig. 6 for the gravity or vapor system, because its use prevents the water from escaping from the boiler through the return system, in sufficient quantity to endanger the boiler even though no check valve is used in the return. This is an advantage, since the check valve is a potential source of trouble due to the possibility of sticking, either open or shut.

The method shown by Fig. 8 centers about the use of the return trap. Many versions of this well-known heating specialty exist, differing considerably as to appearance, but having the same general purpose.

The use of the return trap tends to make more positive the return of the condensate to the boiler as the return system is made independent of boiler pressure. For this reason, the necessary height of the radiators above the boiler water level is less, as the head need be only sufficient to overcome the resistance of the return system.

Operation of the usual return trap is as follows: condensate coming from the return passes the first check valve, but cannot open the check valve next to the boiler, because of the boiler pressure. Therefore, the condensate rises into the return trap, maintaining a water level in the trap which is the same as the water level in the system. During this cycle, the trap is open to atmosphere.

Eventually, the water level in the trap raises the float, closing the atmospheric vent, and opening the equalizer, or steam connection to the boiler. This pressure closes the return check valve, stopping the flow of water from the return system.

When boiler pressure exists on both sides of the boiler return check valve, the differential in water level of the return trap over the water level of the boiler opens the boiler return check, allowing the condensate to flow from the trap into the boiler. Eventually, the float closes the pressure equalizer and opens the trap vent, and the cycle repeats.

D. C. Lingo Co. Moves to Larger Quarters

HOUSTON—D. C. Lingo Co., local jobber of air conditioning and manufacturing equipment has moved to a new location at 1414 Fannin St. This location offers a 25% increase in floor space, and marks the third time in four years that the concern has moved to larger quarters, according to Mr. Lingo.

Mr. Lingo also announces that the company has improved its lines and increased its stocks, and is now equipped to offer complete jobbing service

Diagrams of Boiler Connections

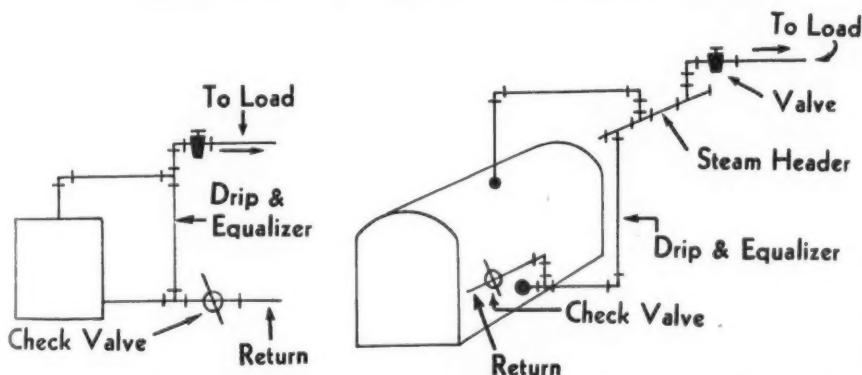


Fig. 5 shows a steam heating system where water is returned by means of a "drip."

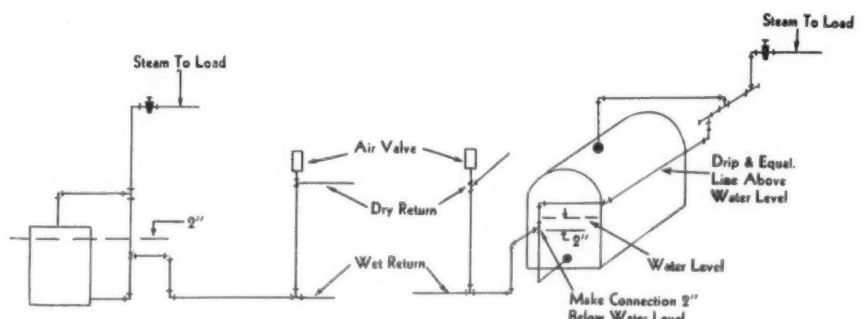


Fig. 6 shows installation of air valve on return lines.

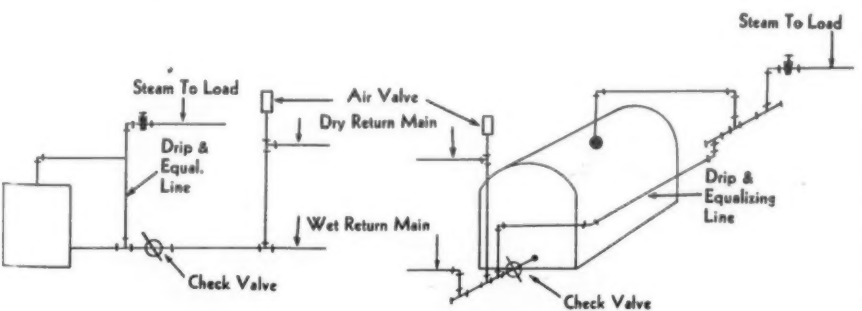


Fig. 7—This hookup to the boiler is preferred to the method shown in Fig. 6 as it prevents water from escaping into the return line.

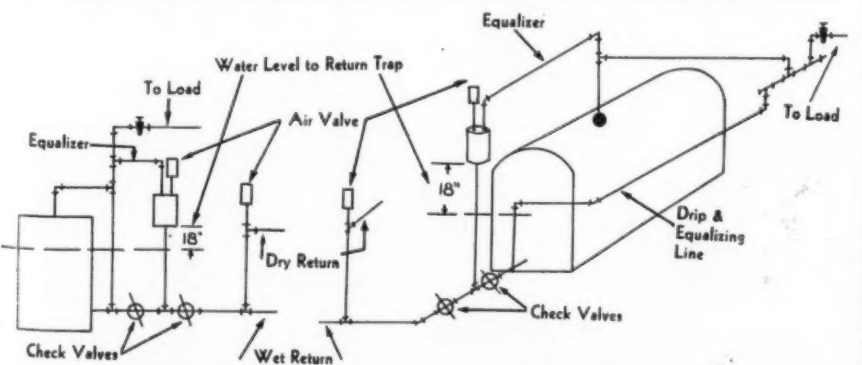


Fig. 8—Return traps are used on this system.

DISTRIBUTORS and SALES AGENTS

WANTED

for **KOCH COMMERCIAL REFRIGERATOR CABINETS**

Some very good territories still available

Complete Market Equipment by **KOCH**

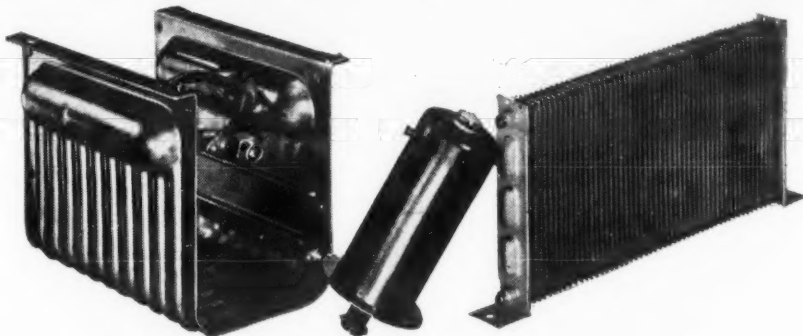
KOCH Display Cases Have 4-in. Corkboard Insulation, Triple Plate Glass, and Are Porcelain Clad

Write for full information, stating qualifications

KOCH REFRIGERATORS

North Kansas City, Mo.

SUPPLYING THE REFRIGERATION INDUSTRY



Evaporators, Receivers, Condensers, Compressor Domes, Compressors and Mechanical Parts. Also "Houdize," a perfected process for permanently uniting ferrous or non-ferrous metals.

OAKES PRODUCTS CORP.
North Chicago and Decatur, Ill.

HOUE ENGINEERING CORP.
Buffalo, New York

DIVISIONS OF HOWDAILIE-HIERSHIEY CORPORATION
General Executive Offices: Detroit, Mich.

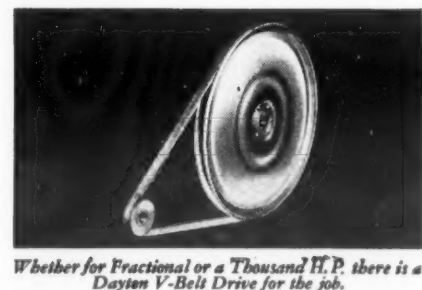
LEADING MAKERS OF REFRIGERATING AND AIR CONDITIONING EQUIPMENT STANDARDIZE ON

Dayton V-BELTS

Because of their outstanding advantages Dayton V-Belts have been used as original equipment on leading makes of air conditioning equipment, electric refrigerators, washing machines and other appliances for many years.

Dayton V-Belts are the logical choice because they provide silent, dependable transmission—because their powerful grip prevents slippage—because they run smoothly without weaving, twisting or vibrating.

A nearby distributor carries a complete stock of Dayton V-Belts at all



Whether for Fractional or a Thousand H.P. there is a Dayton V-Belt Drive for the job.

times and can quickly supply you. Write us for price list and complete information.

THE DAYTON RUBBER MANUFACTURING CO. • DAYTON, OHIO
World's Largest Manufacturer of V-Belts

REFRIGERATION PARTS

DOMESTIC • COMMERCIAL
AIR CONDITIONING
100% WHOLESALE
"We protect the Dealer"

Dependable service that enables you to give speedier service—and the lowest prices possible. Deal with "headquarters" for America's largest line. Write for catalog on your letter-head. Branches: New York—Cleveland—St. Louis.

Send for Our **BIG BARGAIN CATALOG**

THE HARRY ALTER CO.
1728 S. MICHIGAN AVE., CHICAGO, ILL., U.S.A.

Quality by **WEBER**

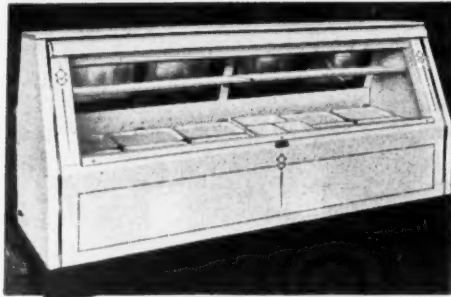


—with a background of forty years of progressive development in the design and manufacture of world-famous retail store equipment—Weber products include the most complete line of Refrigerated Display Cases and Boxes—that offer the greatest dealer possibilities.

WEBER SHOWCASE & FIXTURE CO., INC.
3700 Avalon Blvd.
LOS ANGELES

The Buyer's Guide

Special rates apply to this column only.
Write Advertising Dept. for full information.



THE 3600 LINE OF DISPLAY CASES

MORE SQUARE FEET OF DISPLAY SPACE THAN MANY CASES CONSIDERABLY LARGER!

Three sizes are available—6, 8, and 10 feet long—and you have your choice of Porcelain or DuLux finish. Among the features are extra large rubber composition sliding doors; extra height doors for storage compartment; full view of illuminated display section; removable intermediate shelf; and 3" approved insulation. For real convenience, economy, room and accessibility, these cases have no equal.

SOLD ONLY THROUGH DEALERS & JOBBERS
WRITE FOR COMPLETE CATALOG

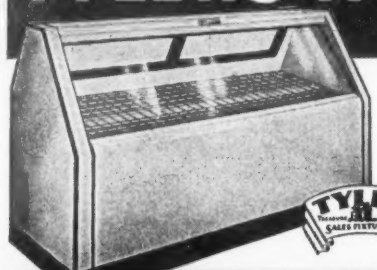
GLOEKLER MANUFACTURING COMPANY
429 FOURTH AVENUE PITTSBURGH, PA.



MANUFACTURERS

Seamless
Brass & Copper Tubing
Refrigerator Tubing
Water Service Tubing
Carton Packed Tubing
Formed Tubing
Electro Tin Plated Tubing

TYLER'S NEW WELDED STEEL REFRIGERATOR CASES



At last a general purpose case at a sensible price. Offers every advantage of the most costly cases at tremendous savings. Modern in every detail. Comes equipped with coils. Single and double duty models.

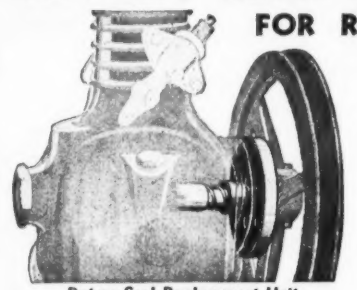
AN AMAZING VALUE

Hundreds in use. Perfect refrigeration for meat, dairy and delicatessen products and all perishables sold in food stores. Write or wire for all the facts.

TYLER Sales-Fixture CO. Dept. E, Niles, Mich.

3 INCH INSULATION-TRIPLE GLASS

ROTARY SEAL REPLACEMENT UNITS FOR REFRIGERATOR COMPRESSORS

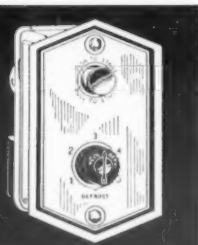


- QUICKLY AND EASILY INSTALLED
- SAVE TIME AND TROUBLE
- PREVENT SHAFT LEAKS

With the many acknowledged advantages, ROTARY SEAL UNITS are unquestionably the most perfect replacement seal units available.

STRONG, ECONOMICAL, SILENT
GUARANTEED TO GIVE PERFECT SATISFACTION

ROTARY SEAL COMPANY
801 W. Madison St. Chicago, Ill.

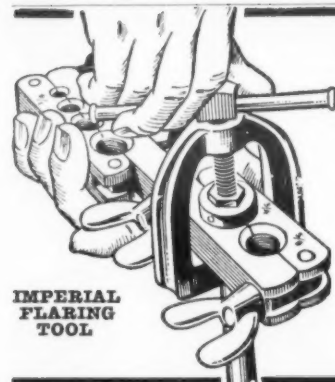


The ORIGINAL Stainless Steel Thermostat

Replace with Rancostat! More EXACT REPLACEMENTS than any other line. And every model a precision unit of highest quality. Write for Bulletin No. 655.

RANCO, Inc., Columbus, Ohio

RANCOSTAT



A Flare in 30 Seconds with the IMPERIAL FLARING TOOL

A POPULAR example of this up-to-date line. A leakproof flare at once for S.A.E. joints, without splitting or cracking the tube. No loose dies to get lost or mislaid. No vise required. No need to disconnect the tube from installation.

No. 175-F. 3/16", 1/4", 5/8", 1/2", 3/4", 1" tube \$4.85
Order from your jobber. Catalog 77-E on request.

IMPERIAL BRASS MFG. CO.
565 S. Racine Ave., CHICAGO

Each Succeeding Day finds

KOLD-HOLD

more firmly entrenched as the predominant system of Truck Refrigeration

KOLD-HOLD MFG. CO., LANSING, MICH.

Service Methods

Proper Methods of Handling And Cutting Copper Tubing

By the Engineering Dept., Wolverine Tube Co.

INEXPERIENCED refrigeration servicemen sometimes think that a coil of copper tubing is not made of good quality copper—that it's not made right—that it's not properly annealed—and that it should be rejected when, as a matter of fact, carelessness in handling the tubing is the cause of the difficulty in making a leak-proof joint.

A new man on the job, or a man grown careless in handling tubing, will unroll an entire coil, use part of it, coil it up, unroll it again for the next job—and by that time wonder why it has become stiff.

When a coil of tubing is returned there is considerable loss of time and money for everyone concerned. The service man may have a black mark against him for the loss in his time and money to his employer, not to mention the inconvenience to the customer. And all this grief is likely due to a failure to instruct someone in the proper handling of copper tubing.

There are two important considerations that may mean the difference between a successful installation or repair job and a job that will be a failure:

First: the tubing you use must be clean, dry, and properly annealed, and must be delivered to you in the same perfect condition.

Second: the tools must be clean and the cutter wheel sharp.

Insist on getting tubing that is made right, that is delivered into your hands clean, dry, and sealed.

Wolverine tubing is made to A.S.T.M. Specifications B68-33. Coils are wrapped in crepe paper for ease of handling and cleanliness. It is dead soft and so pliable that you instinctively want to bend it.

A word of warning. Every time you bend soft tubing it gets a little stiffer. Two or three bends in one place will make that point so stiff that you may have difficulty flaring it.

Every length of Wolverine copper refrigeration tubing is solder-sealed at both ends to preserve the original mirror-bright surface to keep it free from dust and moisture. See Fig. 1.

Solder-Sealed Tubing

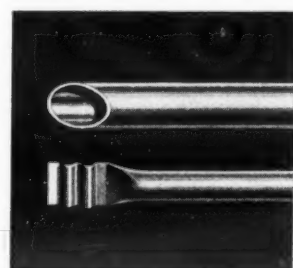


Fig. 1—How Wolverine tubing is solder-sealed at each end to keep it free from dust and moisture.

When you uncoil a roll of tubing, don't grab the free end and start straightening it out a foot at a time. If you do, you'll have a great arc of tubing straight at intervals only and already stiff at those places.

To get a straight length out of the coil, hold the coil with the free end resting on the table or floor and hold that free end tight with one hand while you unroll the coil away from it with the other hand. Repeat the operation until you have as much straight tubing as you need. When you uncoil tubing this way, any stiffening of the tubing is distributed along the entire length and the tubing is still soft enough for easy flaring and bending. See Fig. 2.

Remember this: the more handling

Unrolling Copper Tubing

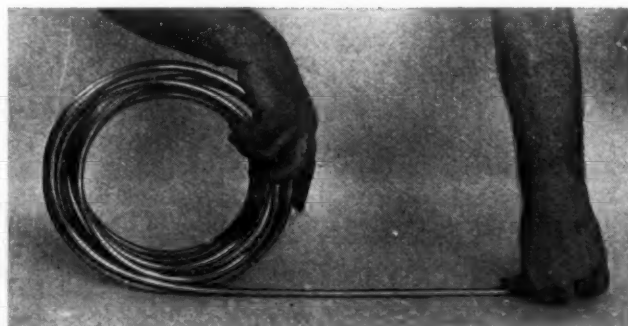


Fig. 2—To get a straight length of copper tubing, the free end should be held flat with one hand while unrolling the coil away from it with the other hand.

(coiling, uncoiling, bending) you give a piece of tubing, the more care you must use in making a flare.

A roller type cutting tool was used in cutting the tubing for the photographs shown. When using this kind of cutter on soft copper tubing, it is easy to apply too much pressure to the set screw. The result will be either a badly dented, misshapen tube, or a tapered end as shown in Fig. 3.

Tapered End

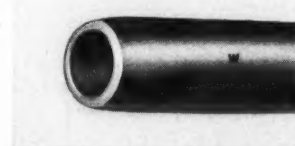


Fig. 3—Too much pressure on roller-type cutter may result in misshapen tubing.

If you make a flare from a tapered end, a rolled edge as in Fig. 4 is the result. It is no good for a flared connection. A quarter turn on the set screw for each revolution of the cutting tool is about the right amount of pressure.

Flare on Tapered End



Fig. 4—Rolled edge flare resulting from tapered-end cut.

Always burr the tubing. If you do not remove the feather edge after cutting soft copper tubing, you may get a broken flare and a leaky joint.

Burrs on Tubing

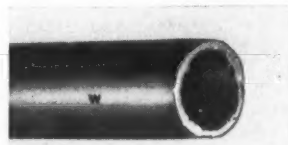


Fig. 5—Burrs on tubing after cutting should be removed.

Neglect in burring a piece of copper tubing after you have worked it in your hands, may cause a crack in the flare. See Fig. 6.

Broken Flare

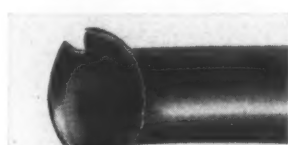


Fig. 6—If burrs are not removed a cracked flare may result.

A good flare can even be produced with tubing that is almost hard temper. Fig. 7 shows an end of a tube which has been properly cut and burred. The flare is free from any ragged edge of metal which would cause a leak and, even though it was made from a section of hard temper tubing, it will make a sound connection.

Always see that the inside of the tubing is free of any bits of metal, loose particles, or copper dust from cutting—a possible cause of valve troubles.

If particles of copper are allowed to accumulate on the flanging tool they will harden and may become embedded on the inside surface of the flare—a possible cause of leaks.

Proper Cut and Flare

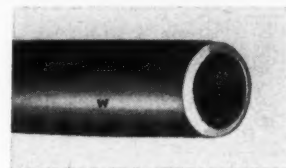


Fig. 7—Tubing properly cut and burred.

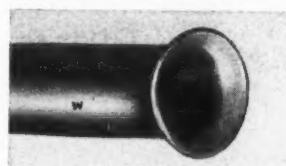


Fig. 8—Good flare resulting from properly cut tubing.

Bending a piece of tubing without tools: Soft annealed tubing can be bent quickly, in one motion, but the result may be a piece of kinked, useless tubing.

To do it properly—grasp the tube in both hands so that there is a distance of about 3 inches between the thumbs. When you start the bending motion, slide the thumbs toward each other along the tubing, exerting an even pressure. Repeat this until the tubing has been bent to the desired angle. A half dozen times is usually sufficient for a 90° inch tube.

In bending a larger tube, start with the hands farther apart and work the tubing to the required angle more slowly. See Fig. 9.

Cutting tubing with a hacksaw: A hacksaw should only be used when you have no cutting tool or when the tubing is too large to fit the tool you have. Never try to force a cut—take it easy—otherwise you will flatten the tube.

A hacksaw cut always produces a rough burr, as Fig. 10 shows. Always use a file or knife to remove this burr, otherwise the joint may leak, even though the tubing does not crack while it is being flared.

Irregular Cuts

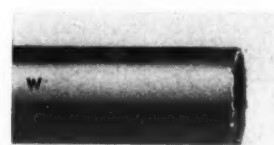


Fig. 10—Rough edge resulting when hacksaw cut is made.

Angular Cut

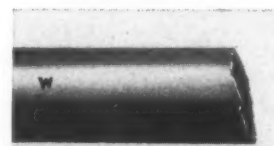


Fig. 11—A tight joint cannot be made with an angular cut.

If a cut made by a hacksaw is not at right angle to the tube, either make another cut or square it up with a file. If this isn't done and the angle is sufficiently great, a tight, leak-proof joint cannot be made.

Bending Tubing without Tools



Fig. 9—The tubing should be held in both hands with thumbs three inches apart. Exert pressure evenly, sliding thumbs towards each other along tubing.

COMMERCIAL Service Manual

By K. M. NEWCUM

Water Valve Adjustments to Attain Specified Pressures

CHAPTER 6—Commercial Condensing Units—Continued

Water-Regulating Valves

The higher the back pressure the higher the efficiency or capacity of the compressor and vice versa. Then if the compressor is designed for average commercial application, that is to operate a meat cooler and case, for example, at normal back pressures the compressor would displace a certain amount of heat laden gas. Hence the condenser is figured for this normal load.

If the same compressor for example were to be used for air-conditioning work at higher suction pressures, a greater amount of heat laden gas would be forced into the condenser and considerably more condensing water would be required to remove this greater heat unit in part.

Most manufacturers install sufficient condenser surface to accommodate the higher suction pressures and in this case when used on a lower suction pressure installation the water consumption would be less than when used for the high suction pressure installation.

Condenser Pressure Determines

The main determining factor in the adjustment of the water valves at the factory is the operating head pressure at which the particular condenser will work most efficiently.

Let us assume that a Freon water-cooled condensing unit of a certain manufacturer operated most satisfactorily at 100 lbs. head pressure. In this case the manufacturer would adjust the water valve to maintain 100 lbs. head pressure. Taking this as an example, water valve setting for methyl chloride would be approximately 87 lbs. and for SO₂ approximately 57 lbs.

Using these pressures as examples we would find that with an inlet water temperature of, for example, 65° F. and an outlet water temperature of 95° F. at set operating back pressures, the water consumption could be fixed at a certain number of gallons per hour.

If the inlet water temperature were increased several degrees, the operat-

ing head pressure would increase only slightly, but gallons per hour of water would increase considerably and vice versa.

The cost of the water as against the cost of the current then must be considered. If water is cheap and current is high it is better to use more water and run at a lower head pressure, but if current is cheap and water higher, then it is best to use less water and operate at a higher head pressure which, of course, would increase the current consumption.

Water Temperature Changes

Needless to say water temperatures vary during different seasons of the year in most localities. It is not considered necessary to make separate or seasonal water valve adjustments. Less water will be consumed during the colder months of the year with lower inlet water temperatures, and more water will be consumed in the hotter months with higher water inlet temperatures.

To arrive at a suitable water valve adjustment for all average conditions where the factory recommended setting is not known, adjust the water valve so that during normal operation the temperature of the water leaving the condenser is between 90° F. and 100° F.

With this outlet water temperature, the operating head pressure should be normal and the water consumption not excessive. If the head pressure is high, check the system for an overcharge of refrigerant or air in the system.

Effect of Air in Condenser

Air in the condenser in a water-cooled system will have the same effect as in an air-cooled system, that is, rob the condenser of valuable condensing capacity with the resultant higher operating head pressure. Under such conditions the condenser should be purged until the operating pressure returns to normal.

With the same outlet water temperature, all condensing units using the same refrigerant will not necessarily operate at the same head pressure. The size and type of the condenser, the operating back pressure, and other factors will affect the head pressure even under normal conditions.

If, however, the service man will set the valve to result in an outlet water temperature of around 90° F. to 100° F., and make sure there is no overcharge of refrigerant or air in the system, he may expect that the resultant head pressure is normal for the system involved.

Head Pressure Too High

If the head pressure persists in remaining higher than desired, the water valve may be adjusted to lower the outlet water temperature by allowing more water to flow through the condenser and in turn lower the head pressure.

Tag Valve

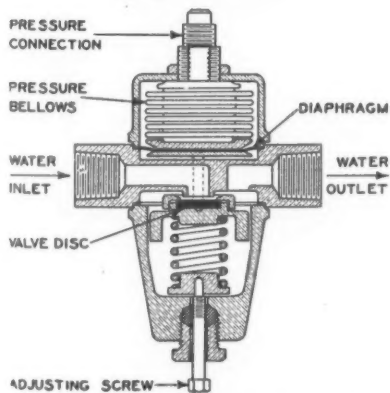


Fig. 80—Water circulating valve made by Tagliabue.

Two Kelvinator Water Valves

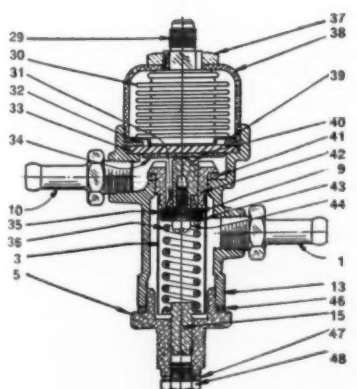


Fig. 81—Kelvinator model "B" bellows-type regulating valve.

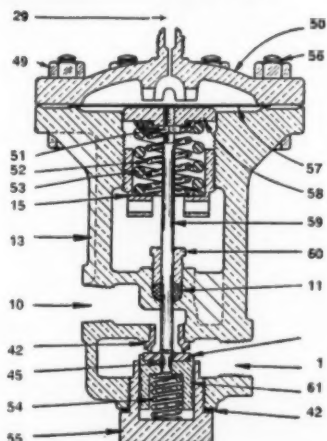


Fig. 82—Kelvinator model "C" diaphragm-type regulating valve.

Conditions of this nature may exist where the condensing unit was designed for a lower operating back pressure and is being operated at a higher back pressure, thereby overtaxing the condenser and requiring more condensing water. This condition can exist again where the compressor has been speeded up by increasing the motor pulley diameter and motor size which would increase the displacement and overtax the condenser.

Another possible condition is where the condensing unit was designed, for example, for SO₂ and the refrigerant was changed to methyl chloride without decreasing the motor pulley size to compensate for the increased displacement efficiency gained by the use of methyl chloride over SO₂.

Various Valve Designs

The construction, design, operating characteristics, and adjustment of several makes and models of water valves are discussed in the following paragraphs.

The Tag water valve shown in Fig. 80 operates with a bellows. A diaphragm is interposed between the bellows and the internal wall of the valve to prevent the water scale and dirt from contacting the bellows. The movement of the valve is effected by the push rod between the buffer plate immediately below the diaphragm and the valve disc.

The valve disc or seat is a composition and may be replaced by removing the lower valve body and the valve disc retainer. The water inlet is at the left of the valve, and valve closes against the water pressure.

The valve is adjustable. Turning the adjusting screw to the right or clockwise decreases the amount of water and vice versa. The low pressure model No. 10160 moves from tight shut to wide open through an increase of 15 to 20 pounds in head pressure and has an operating range of from 40 to 100 pounds.

The Tag high pressure model No. 10161 has an operating range of 60 to 180 pounds and requires an increase of about 30 pounds pressure to move it from tight shut to wide open. Either of these valves will close against a water pressure of 80 lbs.

Bellows Type

Kelvinator model "B" water valve is shown in Fig. 81. It is of the bellows type employing a diaphragm to prevent the water from contacting the bellows. This valve closes with the water pressure and the valve seat is a composition disc which is replaceable. The valve is equipped with a screw strainer, part No. 3. This strainer is removable for cleaning by removing strainer plug part No. 5.

Adjusting screw 15 is accessible by first removing adjusting screw plug 48. Turning adjustment screw to the right decreases the amount of condensing water and vice versa.

Diaphragm Type

Kelvinator model "C" water valve which is of the diaphragm type is shown in Fig. 82. This valve also closes with the water pressure as the inlet is at the left of the drawing or below the seat. The valve seating disc is replaceable. Note the valve is provided with a cushioning piston which contains the spring. It is removable for cleaning by removing cushioning piston guide 55.

Note the location of adjusting screw part No. 15. Turning this screw clockwise decreases the amount of condensing water and vice versa. Located between the water valve body and the atmosphere is a die molded and drilled packing part No. 11. This is to prevent water leaks around the control rod 59.

Packing nut 60 should be tightened just sufficiently to prevent water leaks. It should not be tight enough to cause the control to bend or stick. Removing packing nut 60 and filling around the packing with heavy cup grease will often reduce water leaks and tend to lubricate the control rod.

Note the small drilling between the high pressure control line connection and the diaphragm. This is known as a pulsation drilling or fitting and will be referred to later.

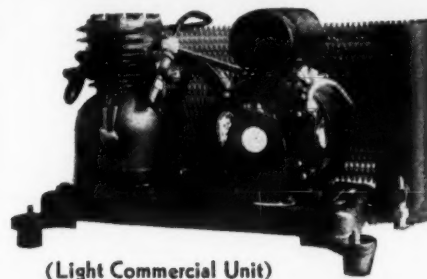
Chicago Issues Revised Refrigeration Code

CHICAGO — Municipal Reference Library has reprinted in mimeograph those sections of the Revised Chicago Code of 1931 relating to refrigeration, with amendments passed by the City Council through Oct. 1, 1936.

Copies of this 12-page publication may be obtained from Municipal Reference Library, Room 1005, City Hall, Chicago, at 10 cents per copy.

The Buyer's Guide

Suppliers Specializing in Service to the
Refrigeration and Air Conditioning Industries



(Light Commercial Unit)

"CHIEFTAIN"

QUALITY-BUILT
COMPRESSORS and
CONDENSING UNITS

All bearings diamond bored. Positive lubrication of parts by newly developed process plus forced feed lubrication in all models.

Sizes: 1/6, 1/5, 1/4, 1/3 h.p.
Write for prices

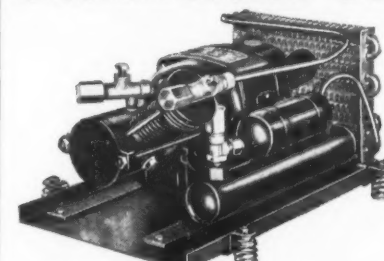
TECUMSEH PRODUCTS CO., Tecumseh, Mich.

MILLS COMPRESSORS

for Commercial Use

Mills Novelty Company • 4100 Fullerton Avenue • Chicago, Illinois

Commercial Condensing Unit...



Model MRK-JR 1/2 or MRK-SR 1/2 HP.
U. S. Patents 1897907—1969237—2018067—2043176

This entire unit is enclosed in a removable, sound-proof metal hood. The compressor assembly is independent of the motor, although direct driven. If necessary, the compressor assembly or motor may be changed independently. The exclusive radial crankcase design permits tilting to a 45° angle in order to save head room, if necessary.

Model MRK-JR is almost universal as a replacement condensing unit whenever a 1/2 hp or a 3/4 hp unit should be used. Model MRK-SR can be applied whenever a 1/2 hp unit is required. Upon request, prices and any further information will be gladly forwarded.

Commercial Refrigeration Co., Inc.
55 South Avenue Rochester, N. Y.

CONDENSING UNITS and COMPRESSORS

FOR

HOUSEHOLD REFRIGERATION

BY

JOHNSON MOTOR CO.

Waukegan, Ill.

MANUFACTURERS OF THE WORLD FAMOUS SEA HORSE OUTBOARD MOTORS

REMPE

FIN COILS - for Commercial Use

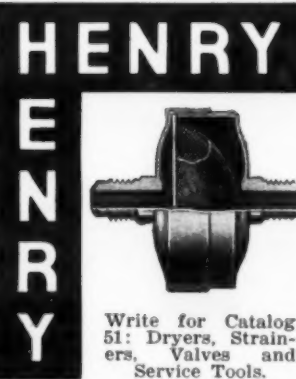
PIPE COILS & BENDS

Rempe Company, 340 N. Sacramento Blvd., Chicago, Illinois

QUIET GILMER V-Belt

QUIET operation — that's what you get in the Gilmer V-Belt. And, dependability, too. It is made ruggedly, to give long, reliable service. Sleeves list the makes serviced for quick, easy identification. In standard sizes to fit all refrigerators, air-conditioning equipment, oil burners, beer pumps, water pumps, washing machines and wood-working tools.

L. H. GILMER CO., Tacony, Philadelphia



Write for Catalog
51: Dryers, Strainers,
Valves and
Service Tools.

Henry Small Strainer TYPE 890

Hemispherical screen has 50% more capacity than usual flat disc. Soldered copper shell. 120 mesh brass screen with No. 10 mesh brass screen reinforcement. Screen area, 4 sq. in. O. D. of shell 2 in. Weight 4 oz. \$2.15
List Price

HENRY VALVE CO. 1001 19 N. SPAULDING AVE.
CHICAGO, ILL.
Stocked by Leading Jobbers

Classified

RATES: Fifty words or less, one insertion, \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Air Conditioning and Refrigeration News, 5229 Cass Ave., Detroit, Mich.

AIR CONDITIONING

FOR AIR CONDITIONING promotion abroad with leading manufacturer, man with foreign trade experience, preferably in electric refrigeration, who has traveled overseas and has successful record of negotiating with and appointing dealers and developing such dealers into profit producing hard-hitting organizations dominating their respective territories. Must be free to travel and able to visualize and grasp complete details of experience, previous earnings and personal history. Include photograph. Interview will be arranged only if complete details are given in letter. Information will be kept confidential. Our personnel knows of this ad. Box 878, Air Conditioning and Refrigeration News.

POSITIONS AVAILABLE

OPPORTUNITIES OPEN for several experienced retail salesmen with dealers in central Florida selling Westinghouse refrigerators, ranges, radios, etc. on commission. A good year-round territory; dependable salesmen can make good money. Married men preferred, should have sufficient funds to finance self for sixty days. Write P. O. Box 330, Orlando, Fla.

POSITIONS WANTED

AMERICAN—capable, taking charge of refrigeration repair shop or service department desires connection with domestic or foreign firm. Available after January first. No objection to traveling. Box 877, Air Conditioning and Refrigeration News.

SALES EXECUTIVE AVAILABLE, with fifteen years of successful experience merchandising all types of major electrical appliances and radios. Now doing an exceptionally fine job as Sales Manager for a leading distributor. Accustomed to engaging and training sales personnel. A married man and a Christian. Legitimate reasons for wishing to make a change and is interested in permanent connection with a reliable distributor or manufacturer. Box 879, Air Conditioning and Refrigeration News.

BUSINESS OPPORTUNITY

FOR SALE, old established good going and growing business, fully equipped good size plant, manufacturing Double Duty porcelain display cases and commercial refrigerators all types, located large eastern city, great opportunity, or will consider partner, experienced. \$50,000 or more needed for expansion. For information write Box 873, Air Conditioning and Refrigeration News.

FRANCHISE WANTED

AMERICAN parts manufacturers desiring Canadian representation to refrigerator manufacturers, jobbers and distributors should consult us. We specialize in refrigeration supplies exclusively. References: Bank of Montreal, Monkland branch, and National Jobbers Association. Factory representatives for Cutler-Hammer, Ranco, Rotary Seal. Address: MODERN HOUSEHOLD APPLIANCES, LTD., 1106 Beaver Hill Hill, Montreal, Canada.

EQUIPMENT FOR SALE

FOR EXPORT and domestic use—reconditioned refrigerators, that look and act like new. Frigidaires, Kelvinator, General Electric, Westinghouse, Norge, others. Starting at \$30. F. O. B. New York. Complete renovating, personally supervised in our own factories—that's why they are as good as new. We are the oldest and largest manufacturers of rebuilt refrigerators. Reference Dun & Bradstreet—National City Bank. FEDERAL REFRIGERATOR CORP., 57 East 25th St., New York City.

GENUINE GRUNOW PARTS for sale. Subject to order within ten days. No. 9316 compressors.....\$19.50 net No. 9750 compressors.....\$22.50 net No. 830 compressors.....\$22.50 net Various other parts in stock. 50 and 25% off list. F.O.B. Albany, N. Y. Terms, net cash with order or C.O.D. All orders subject to stock on hand. SIMMONS WHOLESALE CO., Albany, N. Y.

EQUIPMENT WANTED

WE WILL PURCHASE for cash any quantity of refrigerators, parts, motors and accessories, of any type or description. References: National City Bank, Gramercy Park Branch, or Dun-Bradstreet. FEDERAL REFRIGERATOR CORP., 57 E. 25th St., New York City.

REPAIR SERVICE

GENERAL ELECTRIC and Majestic hermetically sealed units repaired and exchanged. Guaranteed work. Wholesale only. Give model when writing. All prices quoted f.o.b. Chicago. AMERICAN REFRIGERATING ENGINEERS, INC., 2257 Silvertown Drive, Chicago, Illinois.

MAJESTICS EXCHANGED or rebuilt \$18.50. Genuine Majestic repair and test equipment and parts used throughout. General Electric household units rebuilt \$25. Prices f.o.b. Chicago. Six months' guarantee. Complete Majestic parts price list on request. REFRIGERATION PRODUCTS, INC., 122 West Illinois St., Chicago, Illinois.

FREE—Did you get yours yet? Price list on repairing electric motors for: refrigerators—oil burners—stokers—water coolers—wash machines and air condition motors. Out of town motors are picked up and delivered by our motor transportation service. Write for our free dealers' price list. P. J. QUINN'S SONS, INC., Electric Motor Repairing, 166 Vernon Ave., Long Island City, N. Y.

MAJESTIC HERMETIC UNITS repaired and exchanged at \$18.50 f.o.b. our factory Chicago. Every unit undergoes complete tests for temperature, cycling, wattage consumption, and quietness on genuine Majestic test equipment from the Grigsby-Grunow plant. Six months' factory guarantee. REFRIGERATION MAINTENANCE CORP., 365 E. Illinois St., Chicago, Ill.

MAJESTIC & GRIGSBY-GRUNOW original and genuine factory refrigerator and radio service. All parts, service replacement units will carry regular factory six-month guarantee. Buy only through our authorized distributors, dealers or ourselves. Complete stock Majestic radio parts and tubes. Write for particulars. GRIGSBY-GRUNOW COMPANY, 5801 Dickens Ave., Chicago, Ill.

SCHOOLS

REFRIGERATION AND AIR CONDITIONING is easiest to understand and explain when we have a clear understanding of the fundamentals. Our extension course is especially practical for executives and others in refrigeration and air conditioning who lack the technical training. Detroit School of Refrigeration and Air Conditioning, 4125 Grand River, Detroit.

Edison G-E Appliance Heater Division Uses Sales Visualizer

CHICAGO—Water heater division of Edison General Electric Appliance Co. here has just introduced the X-Ray Sales Visualizer, a new method of sales presentation designed for use by utility and dealer salesmen in telling the water heater story.

Pages printed in silver, red, blue, and black are spiral bound in an imitation binder, which forms an easel for presentation.

Designed to play the same part that an actual demonstration does in the sale of electric refrigerators, ranges, dishwashers, and laundry equipment, the Visualizer focuses the attention of the prospect on one feature at a time. It tells the complete sales story—"How It's Made," and "How It Works."

Explanatory copy and illustrations are printed on the right side and below the die-cut center, which has a celluloid printed underlay depicting each step in the assembly of a Hot-point water heater. By turning the pages in sequence, the heater is assembled, step by step. By the same method, the heater's operation is shown.

The X-Ray Visualizer was adapted to the water heater by Farkas Bros., Chicago, patentees of the process.

New Company to Handle Majestic Service Parts

CHICAGO—Distribution of all Grigsby-Grunow and Majestic refrigerator and radio parts, service and replacements has been taken over by a new organization located at the main plant of the former Majestic Co. at 5801 Dickens Ave., according to A. Gatz of Grigsby-Grunow Co.

Outdoor Posters Carry Kelvinator Message

DETROIT—Colorful outdoor posters will be used to carry the Kelvinator message in a Christmas selling campaign.

The posters picture a Kelvinator tied with a big red ribbon as the centerpiece in a group of gifts. A youngster half-hidden on the stairs in the background, announces in a shrill whisper: "Pssst! Bobby—it's a Kelvinator."

Irving L. Kordenbrock Joins Emerson Electric Co.

ST. LOUIS—Irving L. Kordenbrock, formerly manager of the electrical appliance department of Famous-Barr Co., local department store, has joined the fan sales staff of Emerson Electric Mfg. Co. here.

Patents

Issued Nov. 3, 1936

2,059,408. HUMIDIFIER. Willet E. Stark, East Cleveland, Ohio, assignor to The Bryant Heater Co., Cleveland. Application July 28, 1934, Serial No. 737,432. 11 Claims. (Cl. 261-15)

2,059,485. ICE CREAM MACHINE. William H. Payne and Francis R. Proper, Kansas City. Application March 12, 1934, Serial No. 715,177. 8 Claims. (Cl. 259-10)

2,059,593. REFRIGERATING APPARATUS. Hubert R. Loranger, Dayton, assignor, by mesne assignments, to General Motors Corp. Application May 27, 1929, Serial No. 366,118. Renewed May 7, 1935. 11 Claims. (Cl. 220-9)

2,059,604. CONFECTION FREEZER. Louis A. M. Phelan, Chicago, and Lawrence E. Koch, Beloit, Wis.; said Koch assignor to said Phelan. Application March 26, 1934, Serial No. 717,358. 3 Claims. (Cl. 259-110)

2,059,637. COOLER, HUMIDIFIER, AND AIR CIRCULATOR. Paul D. Good, West Lawn, Pa. Application May 7, 1936, Serial No. 78,462. 6 Claims. (Cl. 261-103)

2,059,686. COLD DIFFUSION APPARATUS. Donald French, Summit, N. J., assignor to Carrier Engineering Corp., Newark. Application Jan. 16, 1935, Serial No. 2,105. 9 Claims. (Cl. 62-103)

2,059,700. COOLER CABINET. Henry R. Loosley and Wendell O. Lowry, East St. Louis, Ill. Application Feb. 23, 1935, Serial No. 7,716. 3 Claims. (Cl. 312-174)

2,059,715. MEANS FOR AIR CONDITIONING RAILROAD CARS. Alfred E. Stacey, Jr., Essex Fells, Carlyle M. Ashley, South Orange, and Herman Richard Anf, Elizabeth, N. J., assignors, by mesne assignments, to Carrier Engineering Corp., Newark. Application Dec. 26, 1929, Serial No. 416,600. 2 Claims. (Cl. 98-13)

2,059,716. LIQUID LEVEL CONTROL DEVICE. James Swinburne, East Orange, N. J., assignor to Carrier Engineering Corp., Newark. Application Feb. 2, 1934, Serial No. 709,541. 8 Claims. (Cl. 137-68)

2,059,721. METHOD AND MEANS FOR CONTROLLING THE FLOW OF LIQUID. Carlyle M. Ashley, Maplewood, N. J., assignor, by mesne assignments, to Carrier Engineering Corp., Newark. Application Dec. 2, 1933, Serial No. 700,670. 13 Claims. (Cl. 62-152)

2,059,725. SHELL AND TUBE EVAPORATOR. Willis H. Carrier, Elizabeth, N. J., assignor to Carrier Engineering Corp., Newark. Application March 9, 1934, Serial No. 714,768. 11 Claims. (Cl. 62-126)

2,059,840. REFRIGERATING MACHINE. Leonard W. Atchison, Schenectady, assignor to General Electric Co. Application Aug. 21, 1934, Serial No. 740,787. 9 Claims. (Cl. 62-116)

2,059,841. REFRIGERATION. Sigurd Mattias Backstrom, Stockholm, Sweden, assignor, by mesne assignments, to Servel, Inc., Dover, Del. Application Dec. 22, 1933, Serial No. 703,530. In Germany Dec. 30, 1932. 25 Claims. (Cl. 62-119.5)

2,059,864. EVAPORATOR DEVICE. Delos P. Heath, Detroit. Application Sept. 24, 1931, Serial No. 564,729. 2 Claims. (Cl. 62-126)

2,059,874. COLD STORAGE HUMIDIFICATION AND DEHUMIDIFICATION SYSTEM. Walter Jones, Princeton, N. J., assignor to Carrier Engineering Corp., Newark. Application Feb. 14, 1935, Serial No. 6,433. 8 Claims. (Cl. 261-9)

2,059,876. REFRIGERATION. Wilhelm Georg Kogel and Nils Erik Widell, Stockholm, Sweden, assignors, by mesne assignments, to Servel, Inc., Dover, Del. Application July 2, 1934, Serial No. 733,484. In Germany July 3, 1933. 16 Claims. (Cl. 62-119.5)

2,059,877. REFRIGERATION. Wilhelm Kogel, Stockholm, Sweden, assignor, by mesne assignments, to Servel, Inc., Dover, Del. Application July 3, 1934, Serial No. 733,573. In Germany July 15, 1933. 19 Claims. (Cl. 62-119.5)

2,059,878. REFRIGERATOR. Peter Kohler, Stockholm, Sweden, assignor, by mesne assignments, to Servel, Inc., Dover, Del. Application May 3, 1932, Serial No. 608,888. In Germany July 30, 1931. 13 Claims. (Cl. 62-170)

2,059,894. REFRIGERATOR COMPRESSOR. Delbert F. Newman, Schenectady, assignor to General Electric Co. Application June 23, 1933, Serial No. 677,212. 10 Claims. (Cl. 230-30)

2,059,920. COMPRESSOR FITTING. Albert J. Weatherhead, Jr., Cleveland, assignor to The Weatherhead Co., Cleveland. Application April 27, 1934, Serial No. 722,711. 3 Claims. (Cl. 285-122)

2,059,942. REFRIGERATING APPARATUS. J. Lowell Gibson, Dayton, assignor to General Motors Corp., Dayton. Application Jan. 31, 1934, Serial No. 709,140. Renewed March 27, 1936. 16 Claims. (Cl. 62-122)

2,059,970. REFRIGERATING APPARATUS. Robert E. Robillard, Dayton, assignor to General Motors Corp., Dayton. Application Feb. 9, 1935, Serial No. 5,805. 8 Claims. (Cl. 62-104)

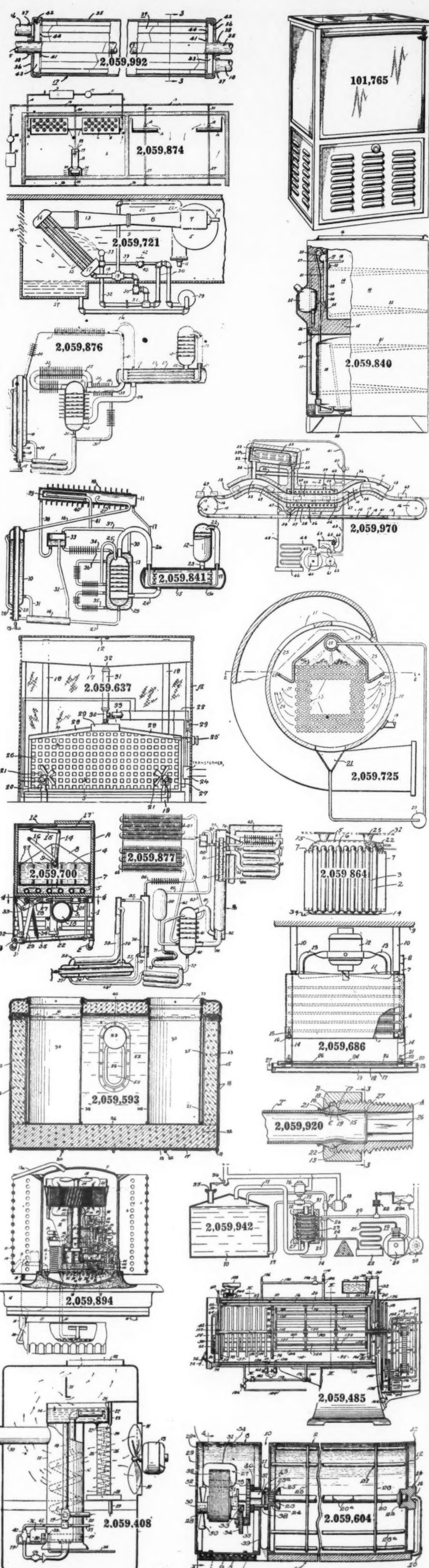
2,059,992. REFRIGERATING APPARATUS. Richard E. Gould, Dayton, assignor to General Motors Corp., Dayton. Application Jan. 25, 1936, Serial No. 60,773. 7 Claims. (Cl. 257-246)

DESIGNS

101,765. DESIGN FOR A REFRIGERATED DEVELOPING UNIT FOR X-RAY PHOTOGRAPHS. Arthur W. Buck, St. Louis, assignor to Buck X-Ray Co., St. Louis. Application May 28, 1936, Serial No. 62,895. Term of patent 14 years.

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.



Improvements in Design of Thermal Expansion Valves Traced by Bergdoll

NEW YORK CITY—How improvements in the design and construction of thermal expansion valves have bettered the operation of such valves in the past two years was explained by J. G. Bergdoll, York Ice Machinery Corp., before the annual A.S.R.E. convention here last week.

Strainers were entirely inadequate for "Freon-12" work, being both too limited in area and too fine in mesh, said Mr. Bergdoll. Some of the first strainers were even filled with glass wool—a carry-over from ammonia practice. Today strainers, when furnished in the valves, are of a much coarser mesh, and invariably the user furnishes a separate large capacity strainer in the main liquid line. "Freon-12" is a cleansing agent, and even with copper tubing mains there will be plenty of foreign matter carried into the liquid strainer.

Use of Solenoid Valves

Solenoid stop valves in the liquid line were common about three years ago. Their purpose was to stop the liquid flow when the compressor shut down, because we could not depend on the thermal valve shutting tight.

This condition has been corrected by the use of better materials for needles and seats, better manufacturing technique, and particularly by better testing and inspection methods, said the speaker.

Some of the earlier valves, the speaker declared, relied entirely on a few strands of packing to seal the adjusting stem and later, when seal caps were applied over these stems, the gasket joints were so inferior that the caps were useless. The gaskets themselves were changed several times until the proper combination of gasket and seat was obtained.

Charge Leakage Eliminated

Leakage of thermal charge from the power elements was a regular occurrence, particularly with the diaphragm type valves. Modern methods of welding, new materials, accurate control of manufacturing processes and rigid requirements for seasoning the assemblies have almost entirely eliminated this trouble.

The bellows type valve had one source of failure not present in the diaphragm type, that is, leakage and consequent loss of refrigerant charge through the body bellows. This problem has been attacked from two angles by the manufacturers. First, the Bakelite extension has been cemented gas tight at both ends. Second, as a result of exhaustive research, non-corrosive, non-fatiguing bellows have been produced—we hope.

Leakage Around Equalizer

When the external equalizer was first introduced, there were difficulties due to liquid leakage from the valve body into the equalizer line and then into the suction line beyond the evaporator, said Mr. Bergdoll. This condition was corrected by using a closer fit around the push rod, and in one case a special baffle was applied to deflect the impinging liquid away from the push rod opening.

"With the bellows type valves, considerable difficulty has been experienced, particularly with the larger

should shut off tight well within the normal full load superheat setting of 10°.

Wet Compression Trouble

Another undesirable condition, declared Mr. Bergdoll, has been encountered on air-conditioning units, due to wet compression caused by a drop in suction pressure.

On any given system with a constant speed compressor, a drop in suction pressure is usually due to a drop in evaporator loading. Under such conditions, a thermal valve designed with a bellows ratio to give a dropping superheat curve with dropping suction pressure at constant valve opening, will tend to cause wet compression.

Factors to This End

Three factors are working toward this end: First, the inherent drop in superheat designed into the valve. Second, the reduction in load requires the valve to close, reducing the superheat setting. Third, the pressure differential across the valve is increasing, requiring the valve to close still further.

York proved that this condition can be satisfactorily corrected, explained the speaker, by having the manufacturer build up several valves having the power bellows and the body bellows of the same size, and trying them out on the same systems. These valves, due to the pressure temperature characteristics of "Freon-12," have a rising superheat characteristic curve with falling suction pressure, which automatically corrects for the reduced load and greater pressure differential condition.

Capacity Reduction

"D. D. Wile in his excellent article on 'Expansion Valve Capacity,' gave

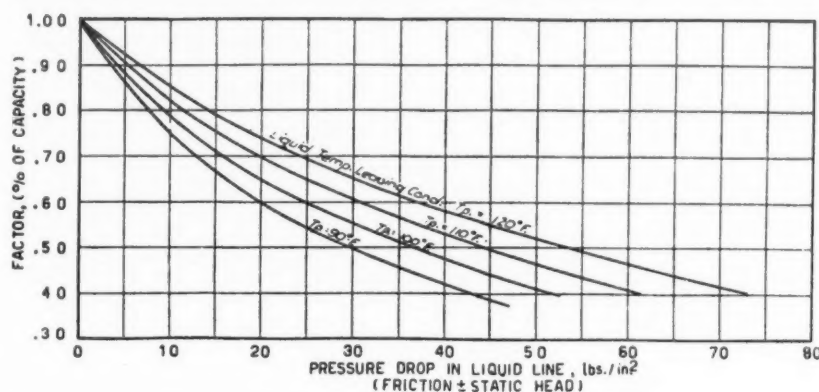
valves, due to the cracking of the Bakelite extension," said the speaker. "These valves are too heavy to be supported by the liquid line alone and it is therefore necessary to clamp the valves to a suitable support. The only convenient place to apply the clamp is around the Bakelite extension.

Breakage on Railroad Jobs

"As a result, any attempt to work on the valve connections or the seal cap over the adjusting stem, might result in a broken extension. Several of these extensions have been found broken on railroad car installations—presumably due to jolts or vibrations normally encountered in this service.

"This point should be seriously considered by the manufacturers, the simplest solutions being to make the extensions strong enough to withstand the strain of a firm clamp and to resist breakage due to railroad car

Figure 1—Corrected Capacity Chart



jolting, or to avoid the necessity of putting any strain whatsoever on the extensions, by making provision on the metal body for supports."

Valve Cycling

York research laboratory tests on some of the latest types of valves indicate that some engineering and application refinements are possible, said the Mr. Bergdoll.

There are a lot of conditions which can cause a valve to cycle, such as long lazy coil circuits, improper bulb application, gasification in the liquid line, a valve considerably oversize for the load or a valve too sensitive to superheat changes, said the speaker.

Valves should be designed for a total capacity change over a range of 5 to 7° F. superheat, he continued. In other words, they should not be super-sensitive, but at the same time they

a curve showing the per cent capacity increase due to liquid sub-cooling at the expansion valve. On the larger systems having long liquid lines and vertical risers, we more often are presenting a mixture of gas and liquid to the expansion valve, than the sub-cooled liquid," Mr. Bergdoll explained.

Capacity Reduction Chart

"To correct ratings for this condition, J. R. Chamberlain of York Ice Machinery Corp. has calculated, by means of the hydraulic formula $V = C\sqrt{2gh}$, the per cent reduction in capacity based on the ratio of the weight of the gas-liquid handled at the same pressure differential.

"The condition of the refrigerant at the expansion valve was assumed to be a homogeneous mixture of gas and liquid having a density corresponding to the specific volume of the mixture. The results of these calculations are plotted on Fig. 1, which results have been closely checked by tests."

Construction Requirements

In closing, Mr. Bergdoll made a final plea to the manufacturers on thermal expansion valve requirements to produce thermal valves that—

1. Don't have inadequate strainers.
2. Won't leak at the needle and seat.
3. Won't permit loss of refrigerant.
4. Won't lose their thermal charge.
5. Are not affected by atmospheric moisture.
6. Will maintain their superheat setting.
7. Won't leak through the external equalizer.
8. Have adequate mechanical strength for mounting purposes.
9. Are carefully tested and inspected before shipment.
10. Are free of pressure cycling when properly applied.
11. Will not permit wet compression under any condition, when set for 10° superheat at full load.
12. Have correct rating curves and correction factors.

BUNDY ANSWERS:

1. Michigan (1902)
2. Stanley Cup
3. St. Augustine, Fla.
4. France
5. Bundyweld Tubing

After the Final ASRE Session



(1) G. J. Hopkins, chief engineer, McCray Refrigerator Corp. (2) D. P. Heath, McCord Radiator. (3) Dan Wile, Detroit Lubricator Co. (4) Harry Williams, Frigidaire Corp., new A.S.R.E. president. (5) One we couldn't identify. (6) Gardner Voorhees, consulting engineer. (7) E. W. McGovern, R & H Chemicals Dept. of du Pont. (8) P. H. Thompson, Alco Valve Co. (9) Harry Lamar, chief engineer, Kerotest Mfg. Co. (10) Mr. Wile again, in a very fine mood. (11) Russ Ayres, General Electric. The News is indebted to John Wyllie of Temprite Products for these, and the other convention pictures on page 2. Many other pictures were taken, but the light in the hall outside the Salle Moderne where sessions were held was too dim for even Mr. Wyllie's high speed camera to get pictures that would reproduce satisfactorily.

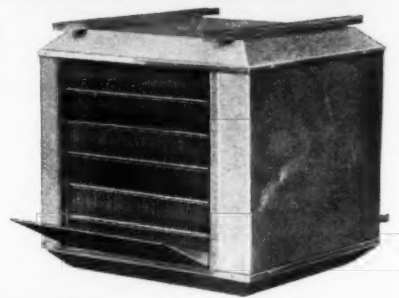
The Buyer's Guide

Special rates apply to this column only.
Write Advertising Dept. for full information.

UNIT COOLERS

CONTROLLED HUMIDITY

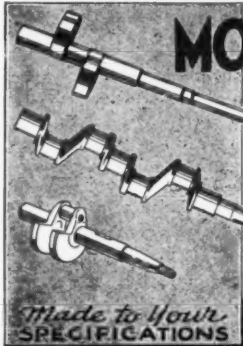
WRITE FOR LITERATURE



JACKSON ACME INDUSTRIES, Inc. MICHIGAN

MODERN Refrigeration SHAFTS

Cut your Shaft costs the "Modern" way... Send your blueprints and ask us to quote you on your specifications for Refrigerator Shafts. "Modern" methods of shaft making guarantee quality, accuracy, service.



Send BLUE PRINTS for Quotations

MODERN MACHINE WORKS
5356 S. KIRKWOOD AVE. CUDAHY, WIS.

HIGHEST Filtrine EFFICIENCY

WATER COOLERS

COMMERCIAL — AIR CONDITIONING

From 2 gals. per hour to 500 gals. per minute

WATER FILTERS — STEEL PIPE COILS — SURGE TANKS

FILTRINE MFG. CO., Brooklyn, N. Y.

PUR O

ELECTRIC WATER COOLERS

Thoroughly reinforced all steel attractively finished cabinets.

Complete line of different Models and Capacities.

Write for details and sales prices.

Puro Filter Corporation of America

440 Lafayette Street, New York City

Spring 7-1800

THE REFRIGERATION LIBRARY—VOL. 3

MASTER SERVICE MANUAL

WHAT TO DO and HOW TO DO IT
For all types of household systems
By E. M. NEWCOM

BUNDESS NEWS PUBLISHING CO.
Publishers of
ELECTRIC REFRIGERATION NEWS

The Master Service Manual (\$3.00 per copy) includes the necessary instructions for servicing all the fundamental types of household systems. Detailed instructions for the servicing of more than a dozen "orphan makes" are also included.

The Refrigeration and Air Conditioning Specifications Book (\$3.00 per copy) contains detailed comparative data which every dealer, salesman, and service man has been wanting.

Combination Price for Both Books, \$5.00

THE REFRIGERATION LIBRARY—VOL. 4

1936 ★ ★ REFRIGERATION & Air Conditioning SPECIFICATIONS

★ ★ All Models, All Makes, All Years
Household & Commercial Types

BUNDESS NEWS PUBLISHING CO.
Publishers of
ELECTRIC REFRIGERATION NEWS

U. S. REFRIGERATION GAUGES

Standard of the Trade



All types of Gauges for refrigeration service and original equipment.

Always ACCURATE... RUGGED... DEPENDABLE

U. S. GAUGE CO.

44 BEAVER STREET

NEW YORK

CAPACITORS

Exact Duplicate replacements for capacitor-start motors. Just the thing for critical servicing of electric refrigerators. • Stocked by leading jobbers everywhere. • Descriptive bulletin listing all popular makes of refrigerator motors and their capacitor replacements, available on request.

AEROVOX CORPORATION

72 Washington St.

Brooklyn, N. Y.



REGISTER NOW

The Red Book